CONTENTS

TRADE NAME	MODEL	SET AND FOLDER No.
Arvin	655 SWT (Ch. RE327)	187-2
Capehart	1T172M, 2C172M (Ch. CT-52), 3C212B, M, 4H212B, M, 5F212M, 6F212B, 7F212M, 8F212B, 9F212M (Ch. CT-57) Tel. Rec.	187-3
Dukane	4C25 Flexiphone	187-4
Dukane	11A55FF, 11B55 Recorder	187-5
Firestone	4-B-67 (Code 120-2-F152)	187-6
Jewel	17C9, 17T9, 17TW7, 21C9, 21T9 Tel. Rec.	187-7
Masco	JM-10	187-8
Motorola	19K2BE, E, 20F1, B (Ch. TS-119, A), 20F2, B, 20K1, B, 20K2 (Ch. TS-119B, C), 20K3, B, 20K4, B, (Ch. TS-119C, C1, D), 20T1, B, 20T2, B (Ch. TS-119B, C), Tel. Rec. Prod. Chge. Bul. 53	187-1
Packard-Bell	2421, 2422, 2423 Tel. Rec.	187-9
Philco	53-656, 53-658	187-10
Sylvania	150A, L, 155A, L, M (Ch. 1-437-3) (Codes C06 and up) Tel. Rec.	187-11
Truetone	D1240A	187-12
V-M	160	187-13
Zenith	K2230E, R, K2240E, R, K2260R, K2263E, K2266, R, K2267E, K2268R, K2270H, R, K2287R, K2290R, K2291E (Ch. 21K20) Tel. Rec.	187-14

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 5 IN SET 122

MODEL	TV CHASSIS
19K2E, BE	TS-119 or TS-119A
20F1, B	TS-119 or TS-119A
20F2, B	TS-119B or TS-119C
20K1, B	TS-119B or TS-119C
20K2	TS-119B or TS-119C
20K3, B	TS-119C, TS-119C1 or TS-119D
20K4, B	TS-119C, TS-119C1 or TS-119D
20T1, B	TS-119B or TS-119C
20T2, B	TS-119B or TS-119C

The above Motorola Television Receivers are electrically identical to Ch. TS-101 and TS-119 covered in Photofact folder 5 in set 122 with the following exceptions.

Ch. TS-119, TS-119A, TS-119B

In later production of Ch. TS-119, TS-119A and TS-119B the following revisions were made: A new Clipper Circuit as shown in Fig. 1, a new Video Compensation Circuit and Test & Adaptor Socket (Fig. 2), a new width coil (Fig. 3), and a new Audio Amplifier Circuit (Fig. 4).

Ch. TS-119C, TS-119C1

On Ch. TS-119C and TS-119C1 the following changes were made in addition to those included in TS-119B above: a new mixer to IF Coupling Circuit (Fig. 5), a new Horizontal Phase Detector Circuit (Fig. 6), a new Sound Take-off (Fig. 7). In addition some sets use a 1N60 Crystal Detector as shown in Fig. 8.

Ch. TS-119C1 also has a cutout on the chassis front for future installation of a UHF tuner.

Ch. TS-119D

Ch. TS-119D is the same as TS-119C1 except a new tuner (TT-22) is used. A schematic is given in Fig. 9.

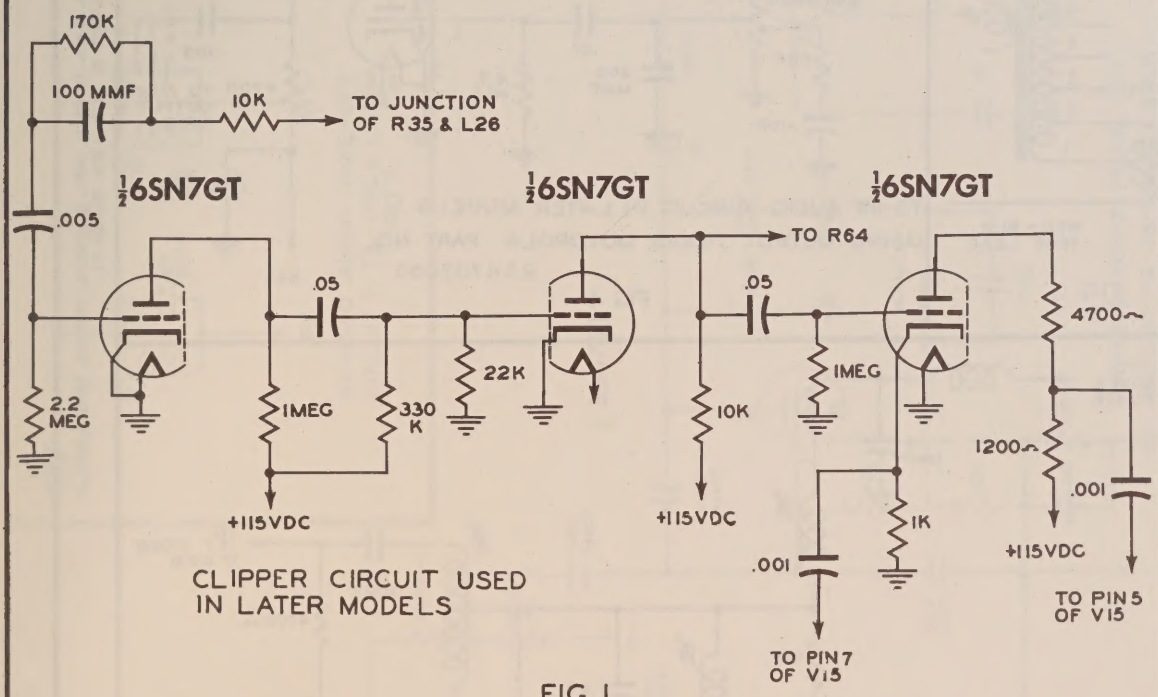

FIG 1

CONTINUED ON REVERSE SIDE

MOTOROLA MODELS 19K2E, BE, 20F1, B (Ch. TS-119, A), 20F2, B, 20K1, B, 20K2 (Ch. TS-119B, C) 20K3, B, 20K4, B (Ch. TS-119C, C1, D), 20T1, B, 20T2, B (Ch. TS-119B, C)

PRODUCTION CHANGES
BULLETIN 53

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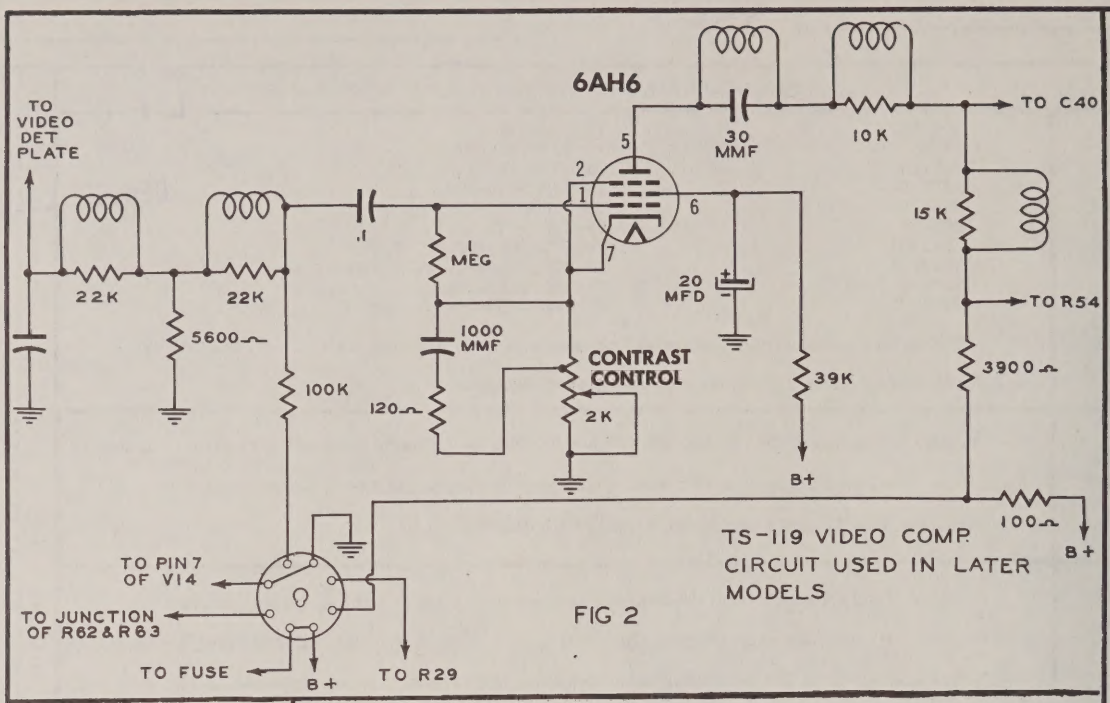


TS-119 VIDEO COMP. CIRCUIT USED IN LATER MODELS

FIG 2

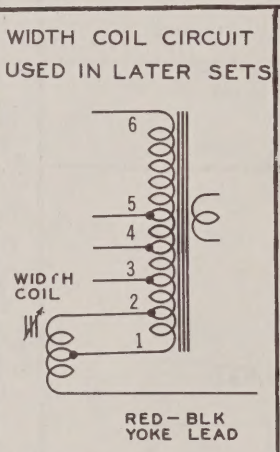
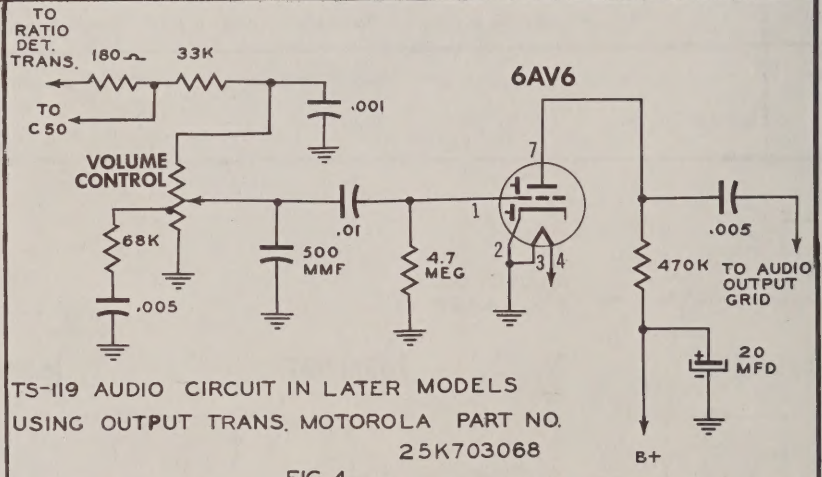
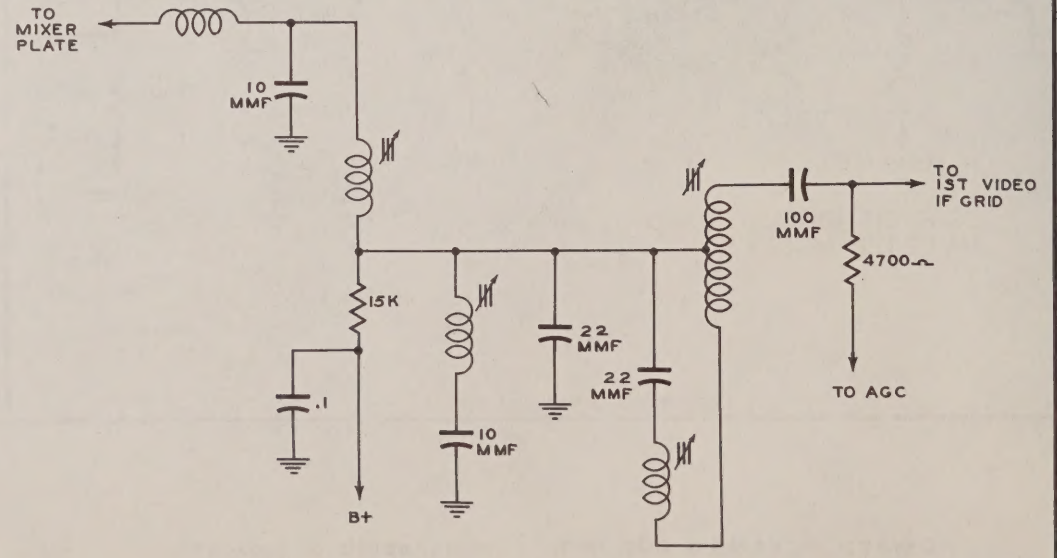


FIG 3



TS-119 AUDIO CIRCUIT IN LATER MODELS USING OUTPUT TRANS. MOTOROLA PART NO. 25K703068

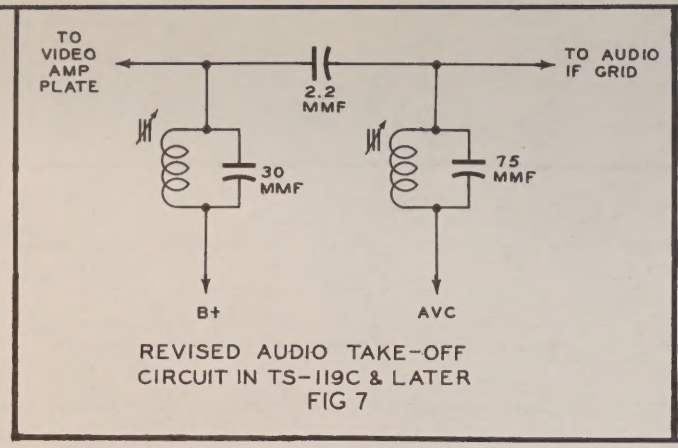
FIG 4



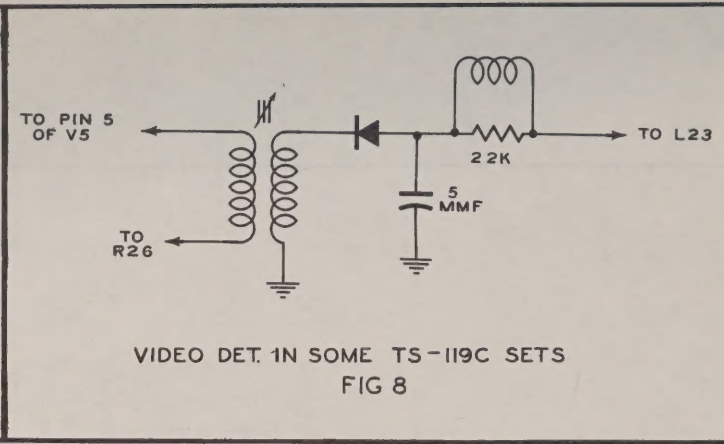
MIXER TO IF COUPLING CIRCUIT USED IN TS-119C & LATER CHASSIS

FIG 5

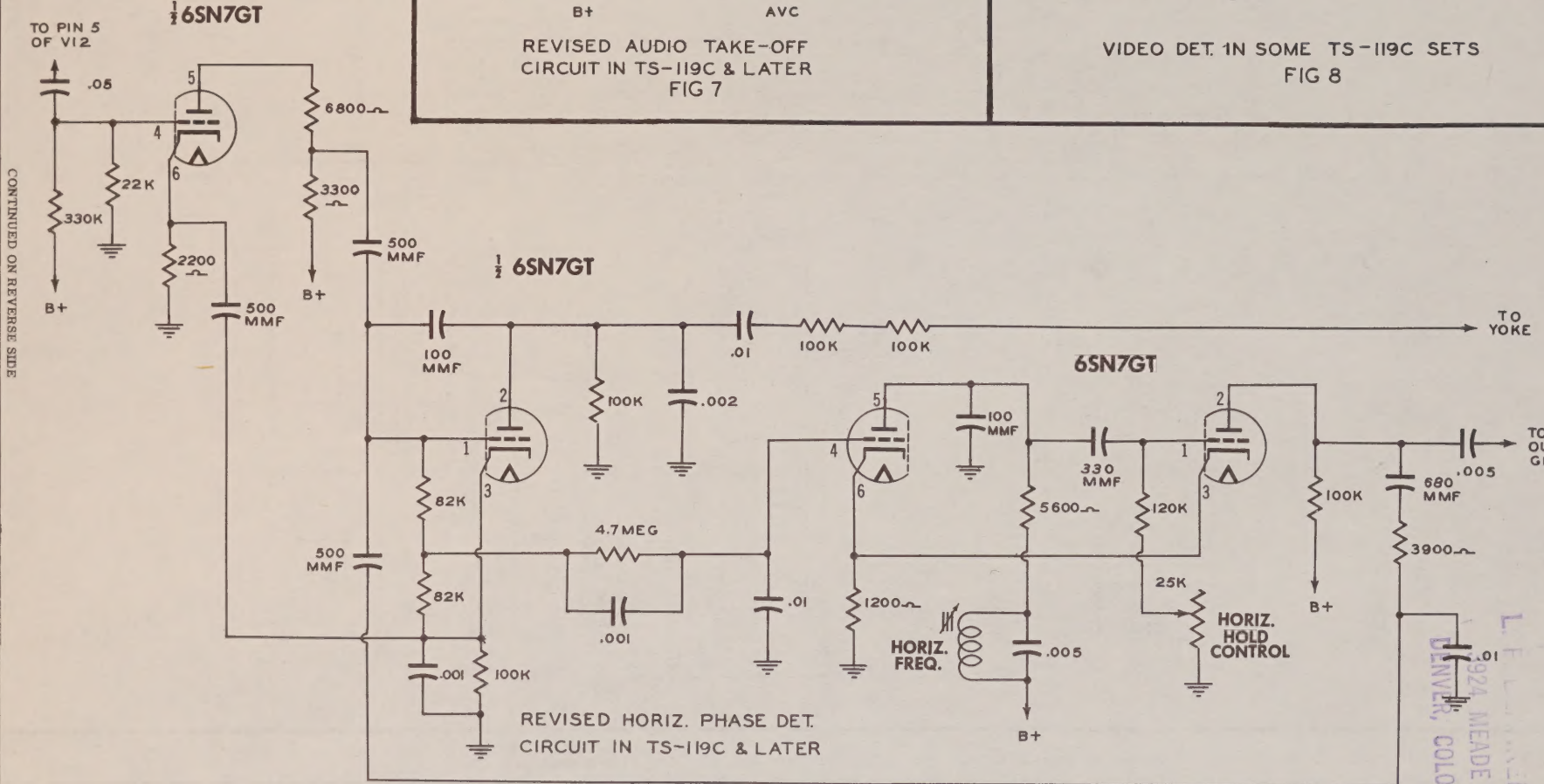
CONTINUED ON NEXT PAGE



REVISED AUDIO TAKE-OFF CIRCUIT IN TS-119C & LATER
FIG 7



VIDEO DET. IN SOME TS-119C SETS
FIG 8



REVISED HORIZ. PHASE DET. CIRCUIT IN TS-119C & LATER

FIG 6

CONTINUED ON REVERSE SIDE

MOTOROLA MODELS 19K2E, BE, 20F1, B(Ch. TS-119, A) 20F2, B, 20K1, B, 20K2
(Ch. TS-119B, C) 20K3, B, 20K4, B(Ch. TS-119C, C1, D) 20T1, B, 20T2, B(Ch, TS-119B, C)

L. E. [illegible] OF
[illegible]NSHIP
924 MEADE ST.
DENVER, COLORADO

MOTOROLA MODELS 19K2E, BE, 20F1, B (Ch. TS-119, A), 20F2, B, 20K1, B, 20K2 (Ch. TS-119B, C)
20K3, B, 20K4, B (Ch. TS-119C, C1, D), 20T1, B, 20T2, B (Ch. TS-119B, C)

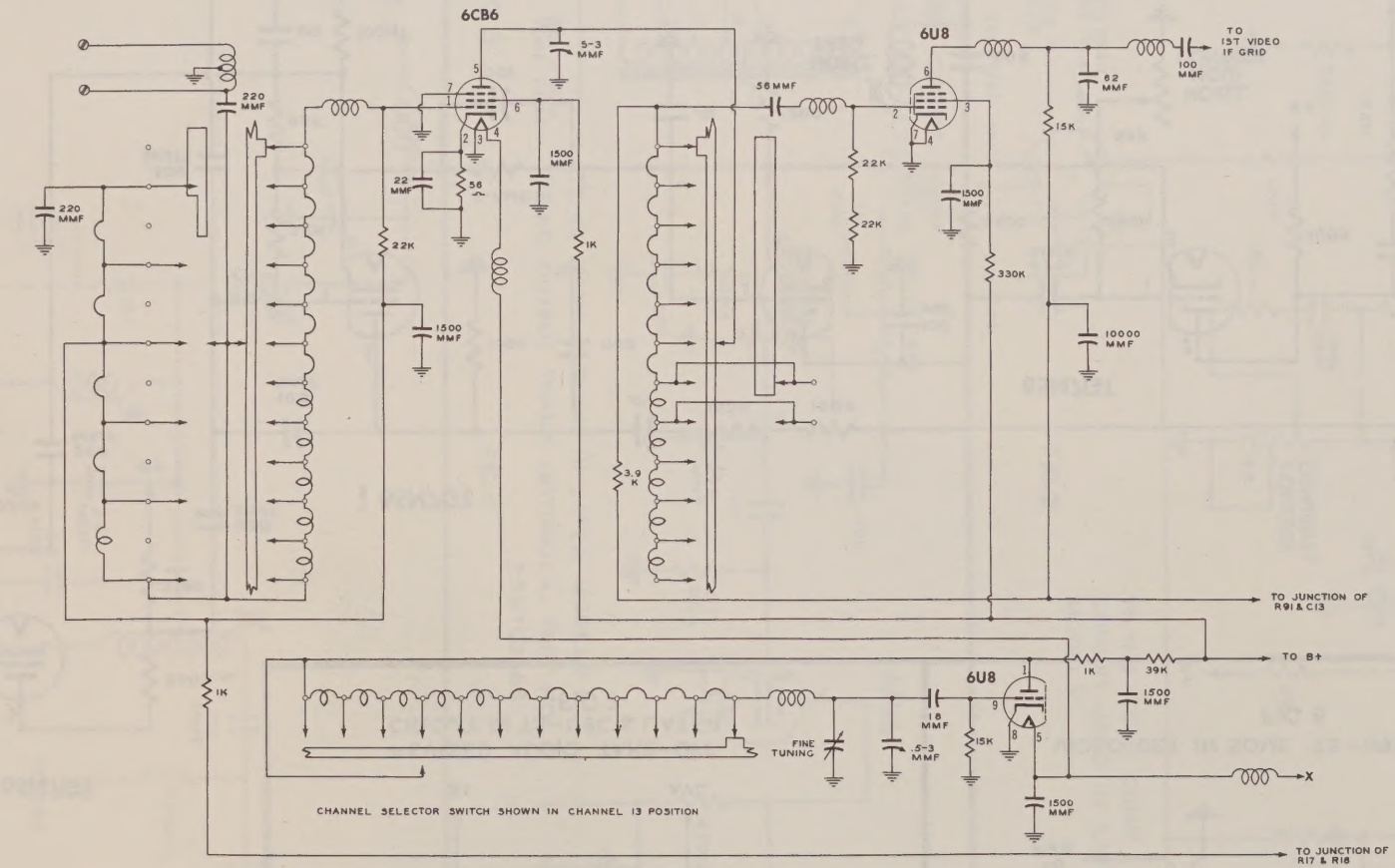


FIG 9

ARVIN MODEL 655SWT (Ch. RE327)

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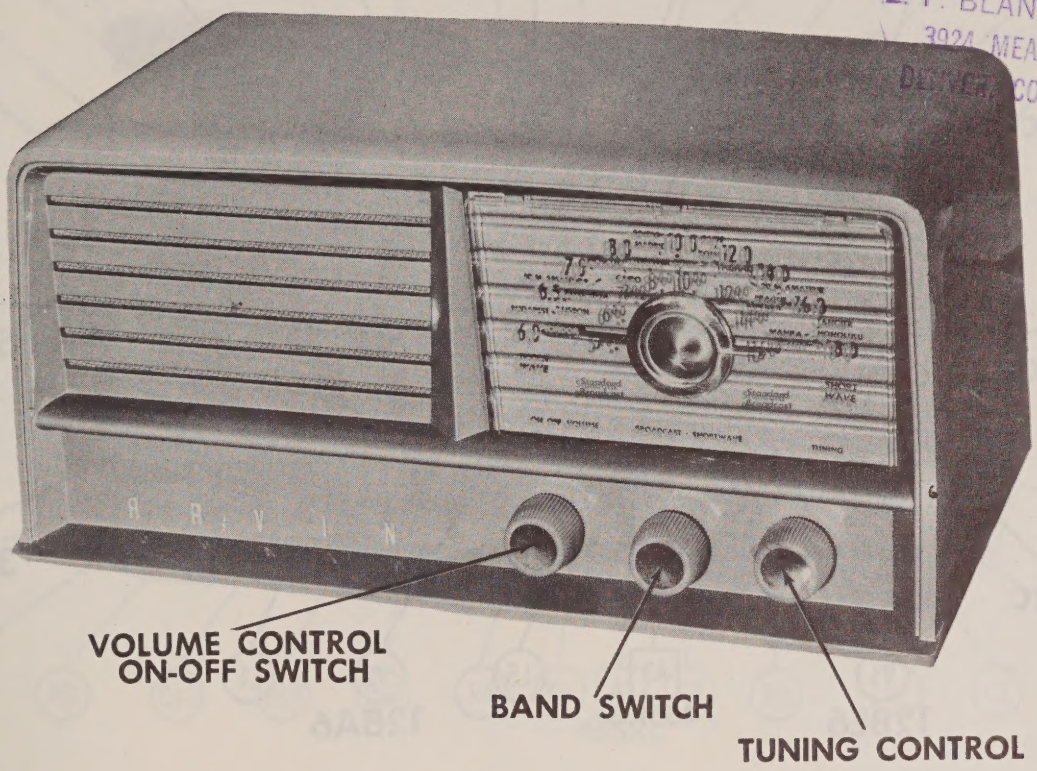
DENVER, COLORADO

ARVIN MODEL
655SWT (Ch. RE327)



ARVIN MODEL
655SWT (Ch. RE327)

TRADE NAME	Arvin Model 655SWT (Ch. RE327)
MANUFACTURER	Arvin Industries, Inc., Columbus, Indiana
TYPE SET	AC-DC Operated 2 Band AM Superheterodyne Receiver
TUBES (Five)	12BE6 Conv., 12BA6 IF Amp., 12AT6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC
RATING	.26 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1620 KC
SHORT WAVE	6-18MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer parallel with base of dial. Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.001MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455 KC (400∿ Mod.)	BC	Tuning gang fully open	Across voice coil	A1, A2 A3, A4	Adjust for maximum output.
2.	"	"	1620 KC	"	"	"	A5	"
3.	"	"	600 KC	"	600 KC	"	A6	Adjust A6 for maximum output if tracking is off considerable at low frequency end of dial, then repeat Step 2.
4.	"	High side to blue lead from antenna loop. Low side to B-.	1400 KC	"	Tune to 1400KC signal	"	A7	Adjust for maximum output.
5.	"	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	18MC	SW.	18MC	"	A8	"
6.	"	High side to short wave antenna terminal. Low side to B-.	16MC	"	16MC	"	A9	"

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ARVIN PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3A	Det.-AVC-IF Amp.	12AT6	12AT6	7BT	
B	Det.-AVC-IF Amp.	12AV6	12AV6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ARVIN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	80	150	A25830	PRS150/80-40-20		EDL8415C		3N538	TVA-3438	Red Blue Green
B	50	150								
C	20	25								
C2	100	500	C20290-101	1468-0001	D6-101	5W5T1	GP1K-101	MC235	1FM-31	
C3	47	500	C20290-470	1468-00005	D6-470	5W5Q5	GP1K-470	MC225	1FM-45	
C4	5600	500	C23099-562							
C5	.047	200		P288-047	DF-503	PTE4S47		PT4147	2TM-S47	
C6	.047	200		P288-047	DF-503	PTE4S47		PT4147	2TM-S47	
C7	220	500		1468-00025	D6-221	5W5T25	GP2K-221	MC240	1FM-325	
C8	.01	600		P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C9A	.005									
B	250		♦A25873							
C										
C10	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C11	.047	400		489ZGXY-05		PJ4S47		PT4147	4TM-S47	
C12	.047	400		489ZGXY-05		PJ4S47		PT4147	4TM-S47	
C13	.047	400		489ZGXY-05		PJ4S47		PT4147	4TM-S47	

♦ Items C9A, C9B, C9C, R8A, R8B are combined in one unit.
When replacing items separately C9B and C9C should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ARVIN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	C22963	Q13-133	AG-60-Z	B-60-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R1A

RESISTORS

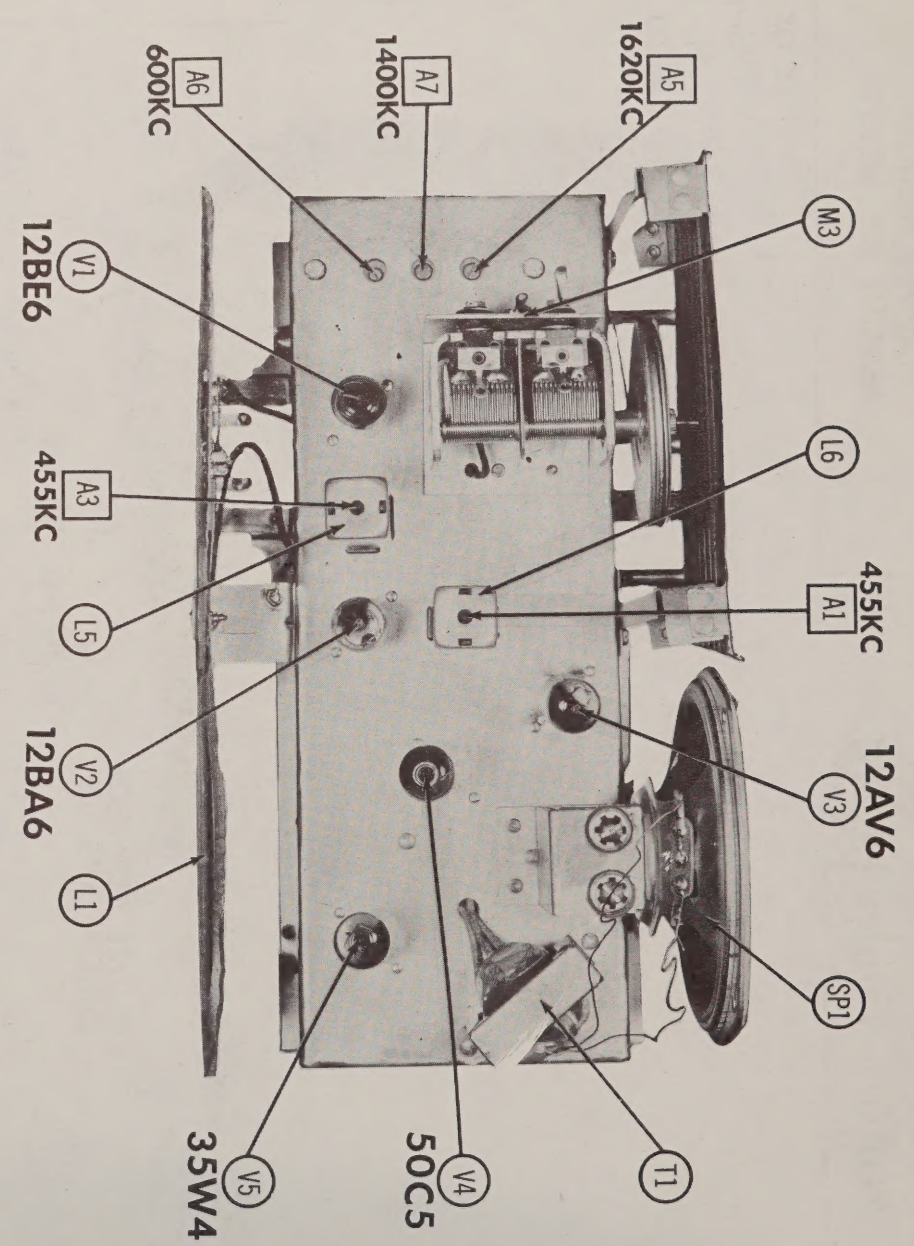
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: ARVIN PART No.	REPLACEMENT DATA: IRC PART No.	NOTES	ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: ARVIN PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	1 Meg	½	C20061-105	BTS-1 Meg		R8A	470KΩ	½	♦A25873	BTS-470K	
R3	22KΩ	½	C20061-223	BTS-22K		B	470KΩ	½		BTS-470K	
R4	1000Ω	½	C20061-102	BTS-1000		R9	150Ω	½	C20061-151	BTS-150	
R5	100Ω	½	C20061-101	BTS-100		R10	1200Ω	2	C20223-122	BTB-1200	
R6	2.2 Meg	½	C20061-225	BTS-2.2Meg		R11	150Ω	½	C20061-151	BTS-150	
R7	4.7Meg	½	C20061-475	BTS-4.7Meg		R12	330KΩ	½	C20061-334	BTS-330K	

♦ Items R8A, R8B, C9A, C9B, C9C are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: ARVIN PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T1	2.75KΩ	3.9Ω	110Ω tap @ 6Ω	.46Ω	AC-25868-1		A-3031	RO-3		

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ARVIN PART No.	JENSEN PART No.	QUAM PART No.	
SP1	5"	PM	3.9Ω	C-27760-1	ST-105 ① Mod. P5-X	5A07 ①	① Fabricate mounting bracket.

COILS (RF-IF)

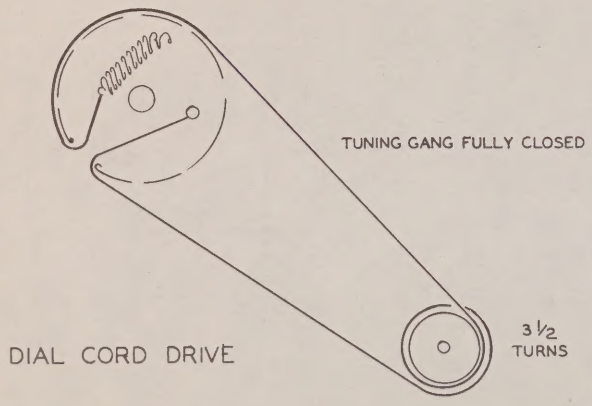
ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	ARVIN PART No.	MERIT PART No.	
L1	Loop Ant.	.1Ω	2.1Ω	D25844		
L2	SW Ant. Coil	.2Ω	0Ω	AC25843-1		
L3	BC Osc. Coil	.4Ω	4.8Ω	AC25871-1		
L4	SW Osc. Coil	.1Ω	0Ω	AC25842-1		
L5	Input IF	15Ω	15Ω	C21797-6	BC-352	
L6	Output IF	15Ω	15Ω	C21797-6	BC-353	

DIAL LIGHTS

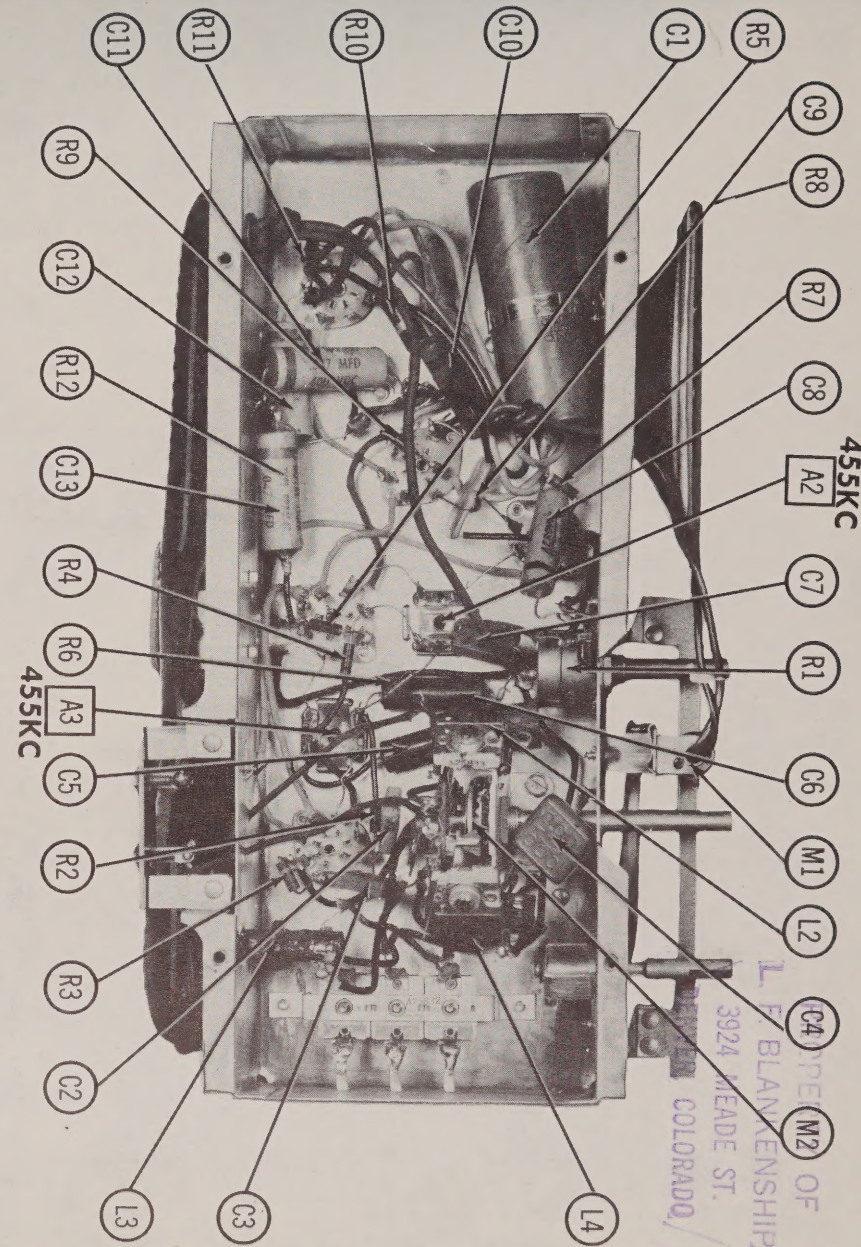
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					ARVIN PART No.		
M1	Bayonet	6-8	.15	Brown	A19351		Type #47

MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
M2	Switch	C25831	Band Selector
M3	Tuning Capacitor	C25834	8-455 MMF, 8-455 MMF
A5			BC Osc. Adj.
A6	Trimmer Strip	A25832	BC Osc. Padder
A7			BC Ant. Adj.
A8	Trimmer	A25833	SW Osc. Adj.
A9	Trimmer	A25833	SW Ant. Adj.
	Cabinet	R23228-5	
	Rear Cover	C23299	
	Knob	A24464-5	3 Used
	Dial Crystal	E40080	
	Dial Pointer	C23461-1	



CHASSIS—BOTTOM VIEW



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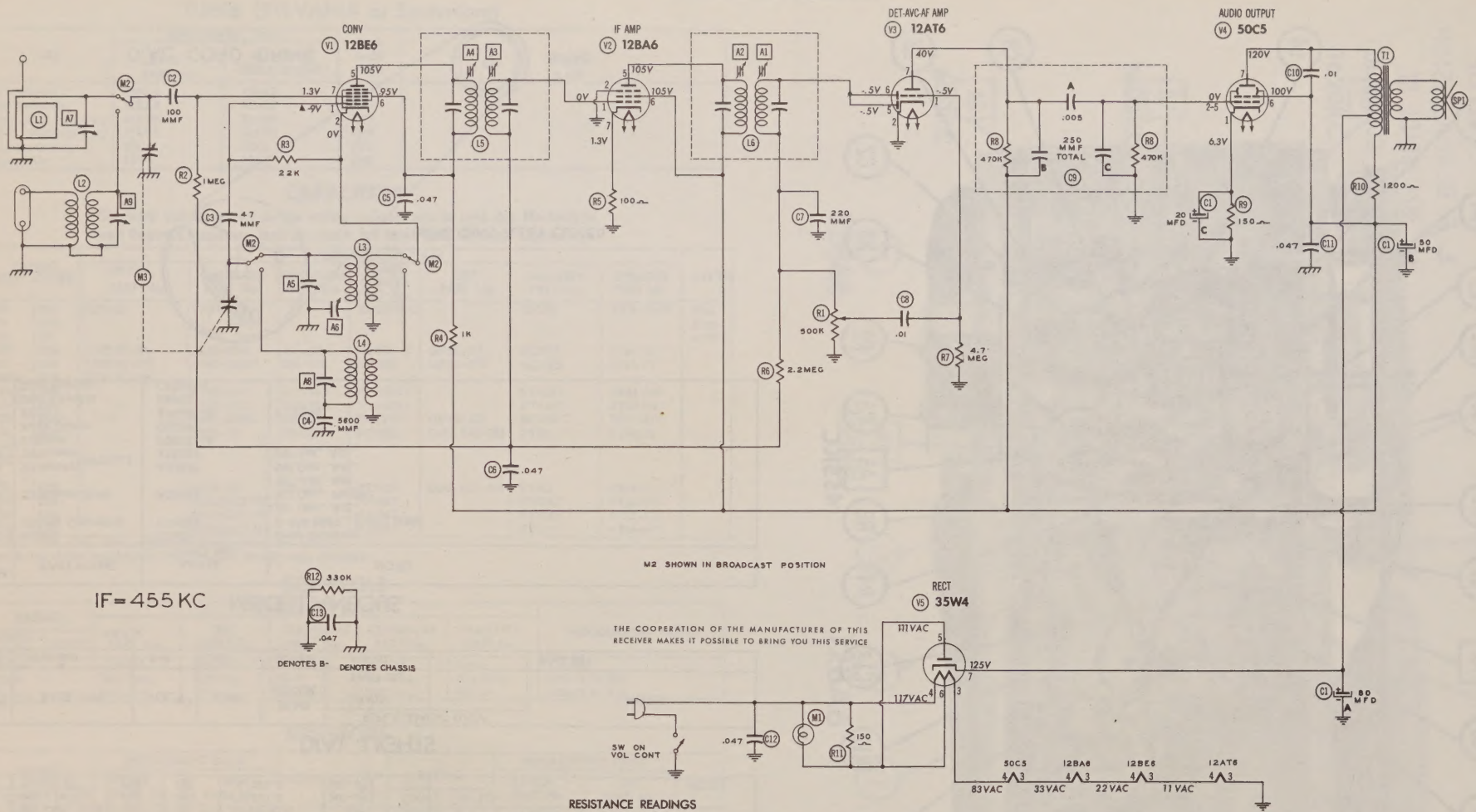
ARVIN
MODEL 655SWT (Ch. RE327)



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.4Ω	12Ω	24Ω	†2.2KΩ	†2.2KΩ	3.7Meg
V 2	12BA6	2.7Meg	0Ω	24Ω	36Ω	†1.2KΩ	†1.2KΩ	100Ω
V 3	12AT6	4.7Meg	0Ω	0Ω	12Ω	500KΩ	500KΩ	†470KΩ
V 4	50C5	150Ω	470KΩ	36Ω	86Ω	470KΩ	†1.2KΩ	†110Ω
V 5	35W4	†6Ω	INF	86Ω	121Ω	118Ω	118Ω	1.3Meg

ALL MEASUREMENTS TAKEN WITH BAND SWITCH IN BC POSITION
† MEASURED FROM PIN #7, V5
▲ TAKEN WITH VACUUM TUBE VOLTMETER

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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187-2

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

*TRADE MARK

CAPEHART MODELS 1T172M, 2C172M (Ch. CT-52), 3C212B, M, 4H212B, M, 5F212M, 6F212B, 7F212M, 8F212B, 9F212M (Ch. CT-57)

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Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MODEL 3C212M

CAPEHART MODELS 1T172M, 2C172M (Ch. CT-52), 3C212B, M, 4H212B, M, 5F212M, 6F212B, 7F212M, 8F212B, 9F212M (Ch. CT-57)

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DATE 12-52 SET 187 FOLDER 3

PHOTOFACT* Folder

*TRADE MARK

CAPEHART MODELS 1T172M, 2C172M (Ch. CT-52), 3C212B, M, 4H212B, M, 5F212M, 6F212B, 7F212M, 8F212B, 9F212M (Ch. CT-57)

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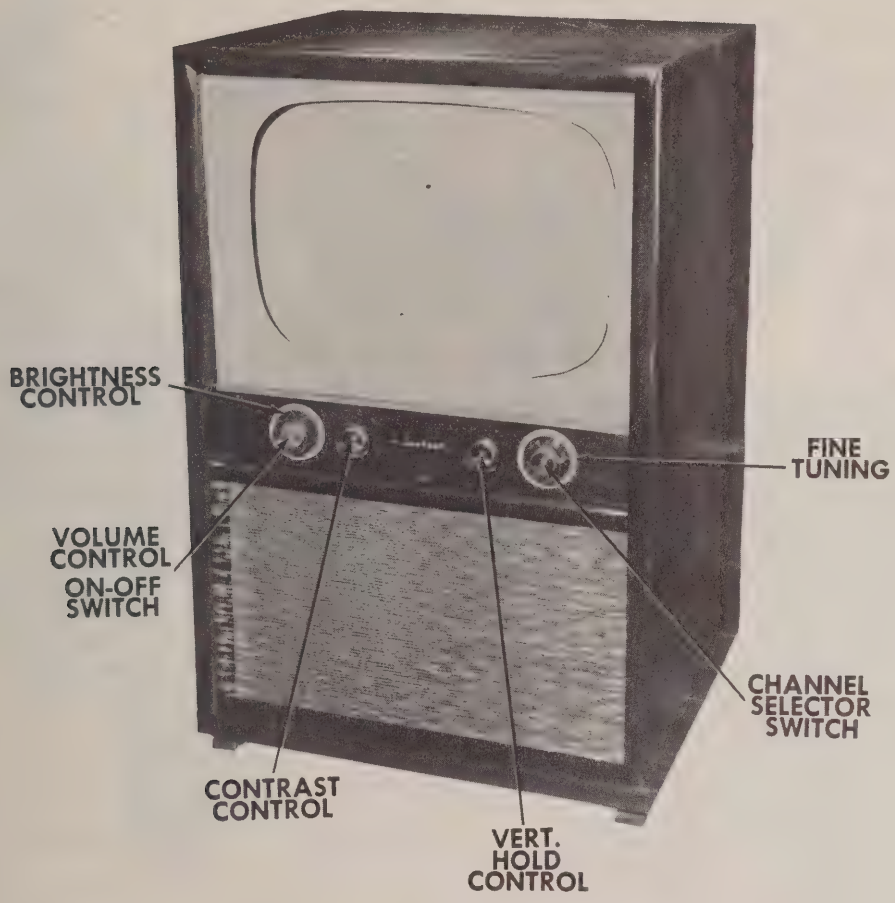

CAPEHART MODELS 1T172M, 2C172M (Ch. CT-52), 3C212B, M, 4H212B, M, 5F212M, 6F212B, 7F212M, 8F212B, 9F212M (Ch. CT-57)

CAPEHART 3C212M

TRADE NAME	Capehart Models 1T172M, 2C172M (Ch. CT52), 3C212M, 3C212B, 4H212M, 4H212B, 5F212M, 6F212B, 7F212M, 8F212B, 9F212M (Ch. CT57) (Ch. Series CX-36)
MANUFACTURER	Capehart-Farnsworth Corp., Fort Wayne, Indiana
TYPE SET	Television Receiver
TUBES	Twenty - Six
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 2.34 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13

INDEX

Alignment Instructions 6, 7
Disassembly Instructions 11
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions 12, 13, 14
Photographs
Cabinet - Rear View 11
Capacitor and Alignment Identification 4, 9
Chassis - Top View 3
Photographs (Con't)
RF Tuner 10
Resistor and Inductor Identification 15, 16
Resistance Measurements 8
Schematic 2
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

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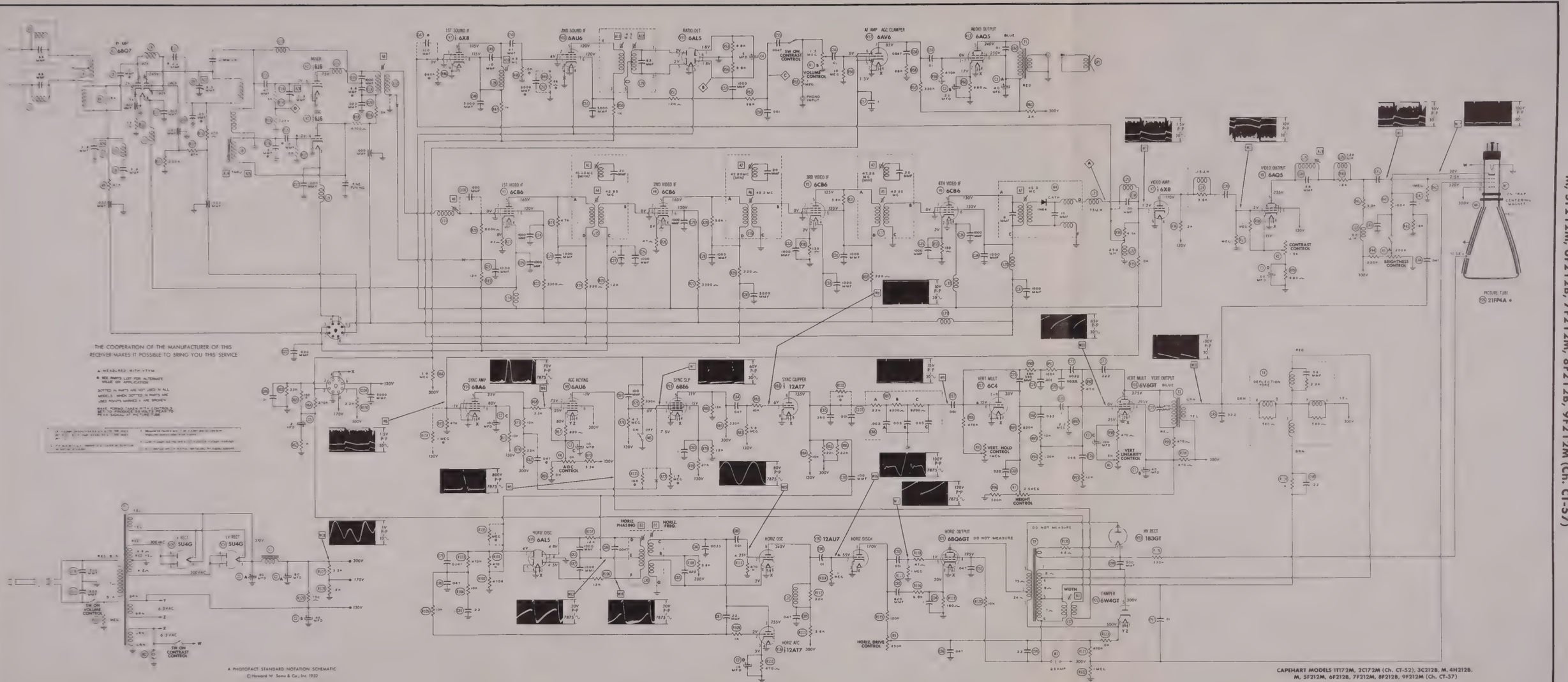
DATE 12-52 SET 187 FOLDER 3


THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1952
CAPEHART MODELS 1T172M, 2C172M (Ch. CT-52), 3C212B, M, 4H212B, M, 5F212M, 6F212B, 7F212M, 8F212B, 9F212M (Ch. CT-57)

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CHASSIS-TOP VIEW

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[illegible] Lincoln St
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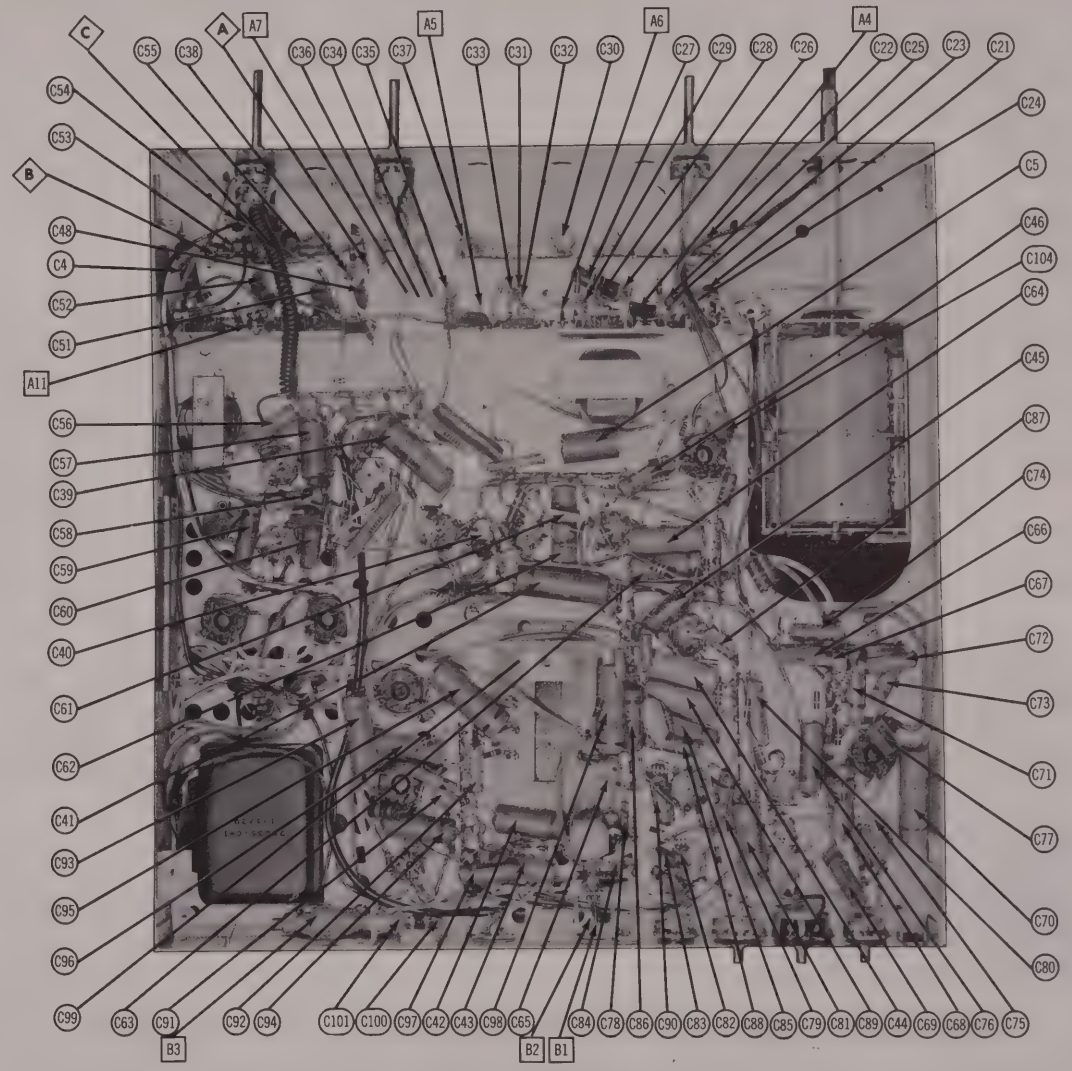

CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART

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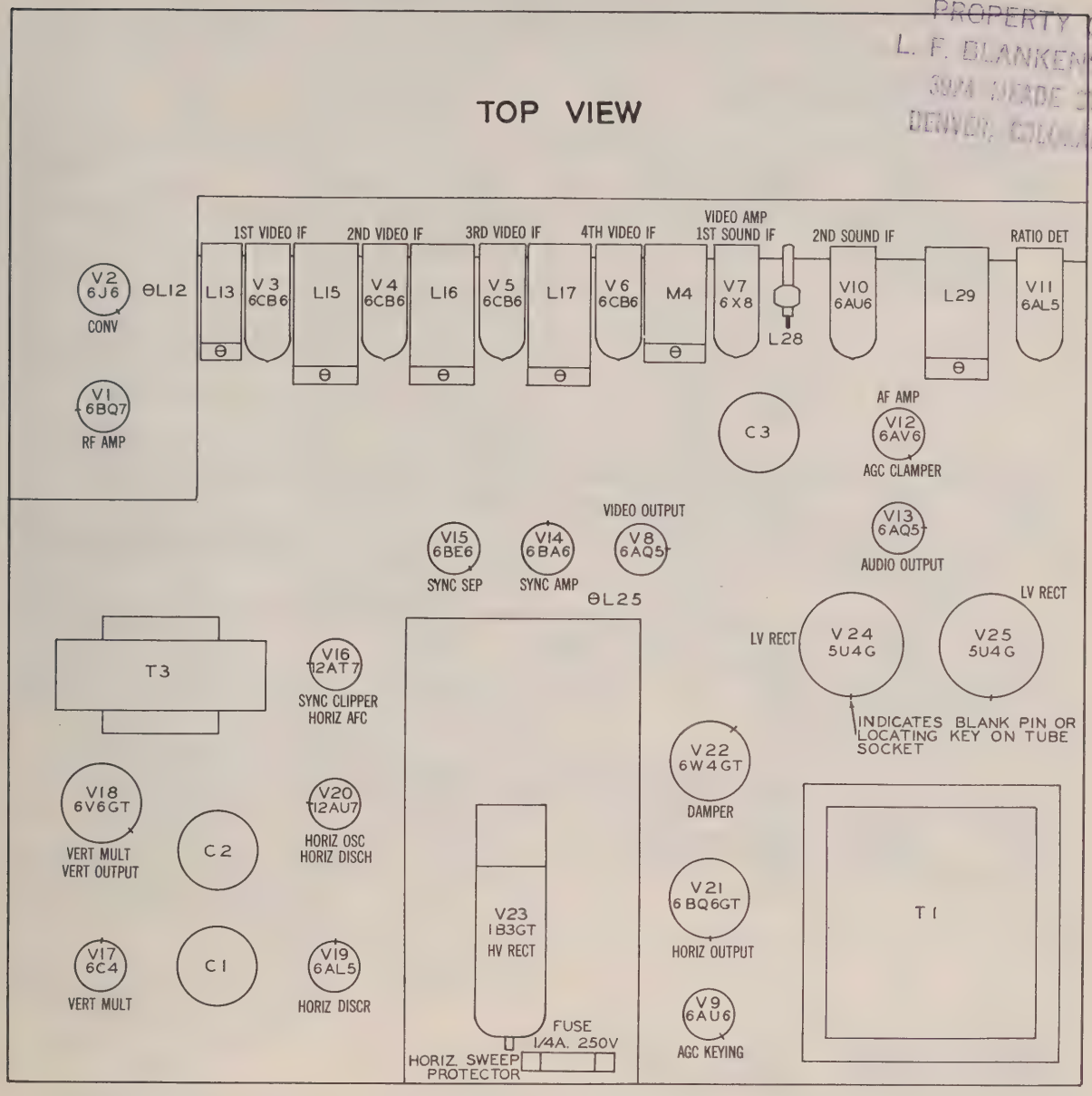


TUBE FAILURE CHECK CHART

The following chart lists tube whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, No sound - V24, V25

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V7, V8, V26
Has pic, no sound - V7, V10, V11, V12, V13
Overloaded picture - V9, V12

SYNC FAILURE
No vert. sync - V16, V17, V18
No horiz. sync - V16, V19, V20
No vert. or horiz. sync - V14, V15, V16

SWEEP FAILURE
No raster, has sound - V20, V21, V22, V23, V26, Fuse (M1)
No vertical deflection - V18
Poor Vert. linearity or foldover - V17, V18
Narrow Picture - V20, V21, V22, V23, V24, V25
Vert. Off freq. -V16, V17, V18
Horiz. Off Freq. - V16, V19, V20
Poor Horiz. linearity or foldover -V20, V21, V22

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal oscillator tube (V20).

VIDEO IF ALIGNMENT

Remove the converter tube (V2) and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to pin 3 of the IF power socket. Connect the positive lead to chassis.
Remove the AGC keying tube (V9) from its socket.
To adjust A7 in step 4 remove the contrast control from the front panel. The adjustment can then be made through this hole, using a thin blade alignment tool.
In step 5 connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	Not used.	41.25MC (Unmod)	Any	Use VTVM DC probe to point (A) Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	"	47.25MC	"	"	A2, A3	"
3.	"	"	"	42.65MC	"	"	A4, A5	Adjust for maximum deflection.
4.	"	"	"	45.3MC	"	"	A6, A7	"
5.	"	"	43MC (10MC Swp)	42.25MC 45.0MC 45.75MC	"	Vert. amp thru 10KΩ to point (A). Low side to chassis.	A8, A9	Adjust for curve similar to fig. 1.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to an ungrounded tube shield floating over dummy converter. tube . Low side to chassis.	43 MC (10MC Swp)	41.25MC 42.25MC 45.0MC 45.75MC 47.25MC	Any	Vert. amp thru 10KΩ to point (A). Low side to chassis.		Check for response similar fig. 2. If necessary, retouch A4 thru A9 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B) Common to chassis.	A10, A11	Remove volume control from front panel. All is accessible thru mounting hole. Adjust for maximum deflection.
8.	"	"	"	"	DC probe to point (C) Common to chassis.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. amp to point (B). Low side to chassis.	A10, A11	Remove volume control from front panel. All is accessible thru the mounting hole. Disconnect stabilizer capacitor C4. Adjust for curve of maximum amplitude and symmetry as in fig. 3.
8.	"	"	"	"	"	Vert. amp to point (C) Low side to chassis.	A12	Reconnect capacitor C4. Adjust so that 4.5MC occurs at center of crossover lines as in fig. 4. SLIGHTLY retouch All for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.001MFD	High side to point (A) Low side to chassis.	Not used.	4.5MC (400% Mod)	Any	Vert. amp thru detector (fig. 5) to pin 2 of picture tube. Low side to chassis.	A13	Adjust for MINIMUM 400% indication on scope.

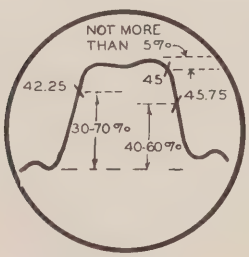


FIG.1

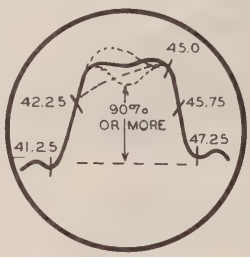


FIG.2

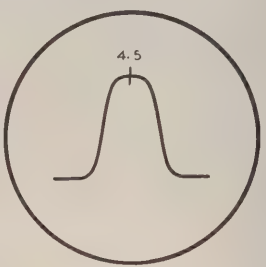


FIG. 3

ALIGNMENT INSTRUCTIONS (CONT.)

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
The individual oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	215.75MC	13	Vert. amp to point A Low side to chassis.	A14	Adjust to place marker in trap notch on low frequency side of response curve.
			207MC (10MC Swp)	209.75MC	12		A15	
			201MC (10MC Swp)	203.75MC	11		A16	
			195MC (10MC Swp)	197.75MC	10		A17	
			189MC (10MC Swp)	191.75MC	9		A18	
			183MC (10MC Swp)	185.75MC	8		A19	
			177MC (10MC Swp)	179.75MC	7		A20	
			85MC (10MC Swp)	87.75MC	6		A21	
			79MC (10MC Swp)	81.75MC	5		A22	
			69MC (10MC Swp)	71.75MC	4		A23	
			63MC (10MC Swp)	65.75MC	3		A24	
			57MC (10MC Swp)	59.75MC	2		A25	

RF AND MIXER ALIGNMENT

Connect bias battery as in Video IF Alignment.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. amp thru 10KΩ to point D Low side to chassis.	A26, A27 A28	Adjust for response as shown in fig. 6.
12.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response as in fig. 6. If markers fall below 70% on any channel make compromise adjustment of A26, A27 and A28 with channel switch set to that channel, then check all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

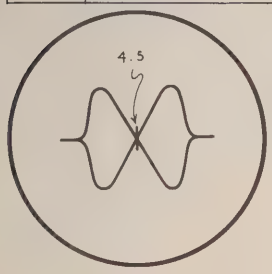


FIG. 4

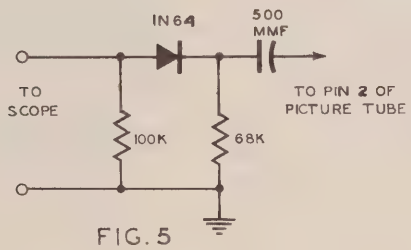


FIG. 5

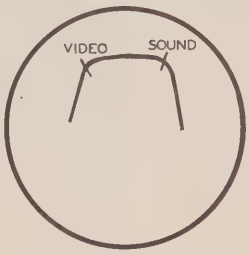


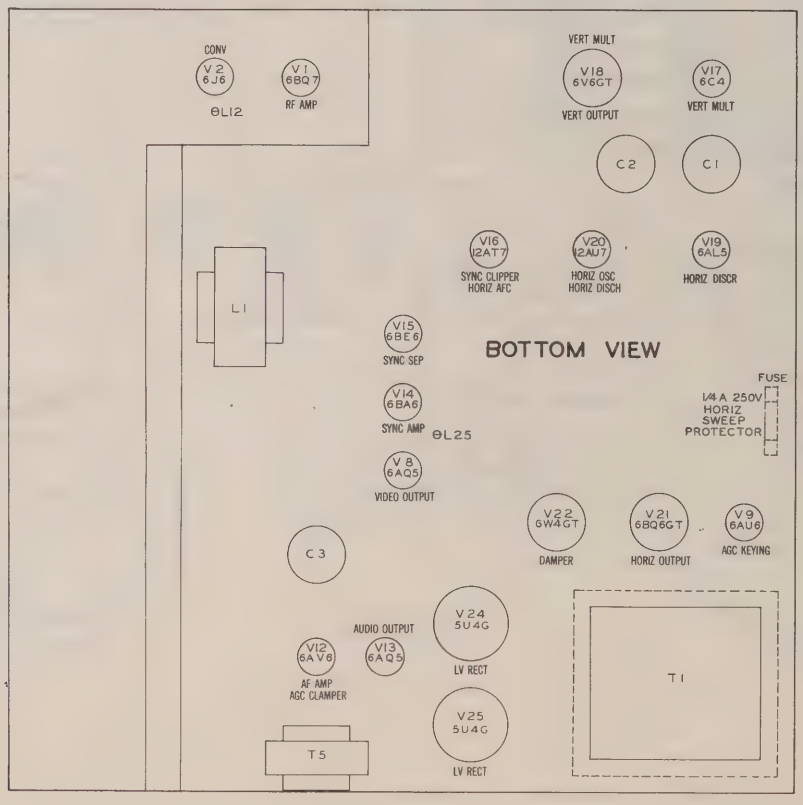
FIG. 6

CAPEHART MODELS 1T172M, 2C172M (Ch. CT-52), 3C212B, M, 4H212B, M, 5F212M, 6F212B, 7F212M, 8F212B, 9F212M (Ch. CT-57)

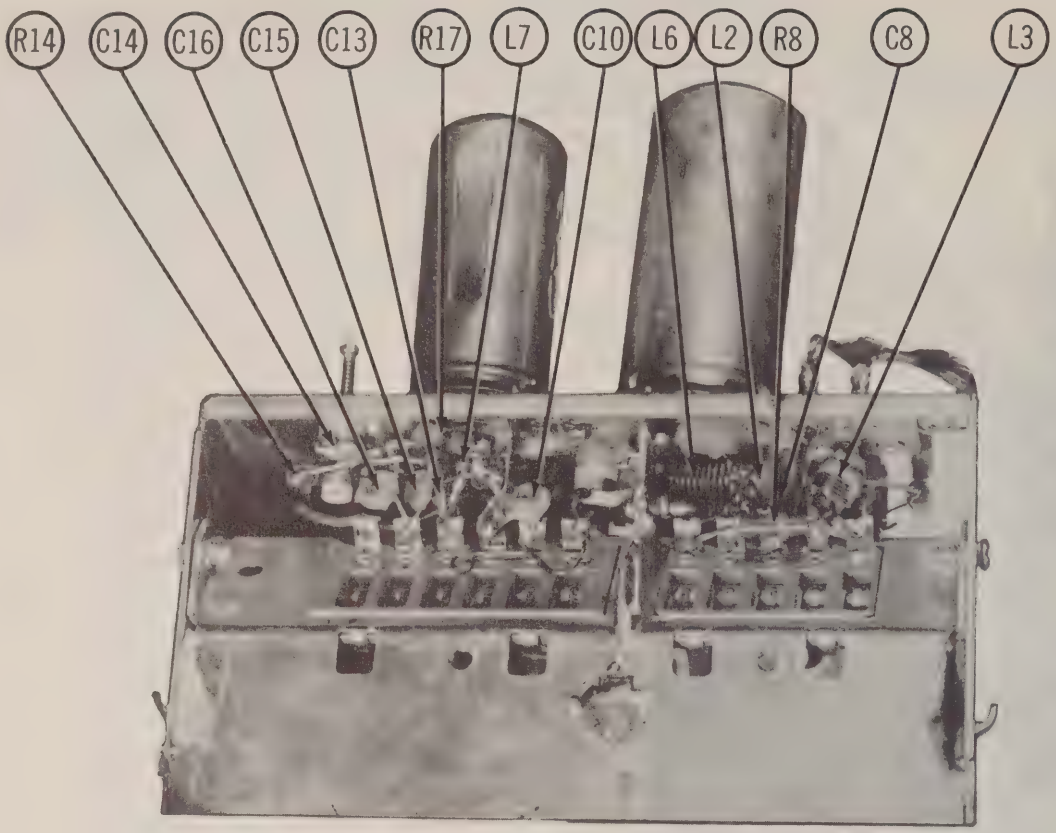
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7	INF	450KΩ	33Ω	.1Ω	0Ω	†2.7KΩ	110KΩ	INF	0Ω
V 2	6J6	†6.5KΩ	†17KΩ	.1Ω	0Ω	235KΩ	10KΩ	0Ω		
V 3	6CB6	45KΩ	47Ω	0Ω	.1Ω	†3.2KΩ	†4.8KΩ	0Ω		
V 4	6CB6	45KΩ	47Ω	0Ω	.1Ω	†3.2KΩ	†4.8KΩ	0Ω		
V 5	6CB6	.1Ω	150Ω	0Ω	.1Ω	†1.8KΩ	†1.8KΩ	0Ω		
V 6	6CB6	.1Ω	150Ω	0Ω	.1Ω	†1.5KΩ	†1.5KΩ	0Ω		
V 7	6X8	0Ω	4.7KΩ	†2.7KΩ	.1Ω	0Ω	0Ω	6Ω	†2.5KΩ	†2.5KΩ
V 8	6AQ5	500KΩ	800Ω	0Ω	.1Ω	†3.3KΩ	†1.5KΩ	500KΩ		
V 9	6AU6	†35KΩ	†7.5KΩ	■0Ω	■.1Ω	180KΩ	†37Ω	†8.3KΩ		
V 10	6AU6	10KΩ	0Ω	0Ω	.1Ω	†2.5KΩ	†2.5KΩ	0Ω		
V 11	6AL5	6.8KΩ	6.8KΩ	.1Ω	0Ω	INF	0Ω	INF		
V 12	6AV6	10Meg	0Ω	0Ω	.1Ω	385KΩ	385KΩ	†330KΩ		
V 13	6AQ5	470KΩ	680Ω	0Ω	.1Ω	†2.5KΩ	†2KΩ	470KΩ		
V 14	6BA6	10KΩ	0Ω	0Ω	.1Ω	†32KΩ	†11KΩ	0Ω		
V 15	6BE6	0Ω	0Ω	0Ω	.1Ω	15KΩ	8KΩ	1.5Meg		
V 16	12AT7	†5.7KΩ	1.4Meg	470Ω	0Ω	0Ω	†5.2KΩ	†3.9Meg	0Ω	.1Ω
V 17	6C4	†1.5Meg	INF	.1Ω	0Ω	†1.5Meg	800KΩ	0Ω		
V 18	6V6GT	INF	0Ω	†1.4KΩ	†500Ω	2.2Meg	†1KΩ	.1Ω	1.5KΩ	
V 19	6AL5	940KΩ	480KΩ	.1Ω	0Ω	0Ω	0Ω	480KΩ		
V 20	12AU7	#310KΩ	1 Meg	0Ω	0Ω	0Ω	†5.6KΩ	470KΩ	20Ω	.1Ω
V 21	6BQ6GT	INF	.1Ω	INF	†10KΩ	1 Meg	7KΩ	0Ω	180Ω	Top Cap #24Ω
V 22	6W4GT	INF	INF	1.5Meg	INF	†47Ω	INF	■.1Ω	■0Ω	
V 23	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								Top Cap #199Ω
V 24	5U4G	INF	7.2KΩ	INF	14.2Ω	INF	14.2Ω	INF	7.2KΩ	
V 25	5U4G	INF	7.2KΩ	INF	14.8Ω	INF	14.8Ω	INF	7.2KΩ	
V 26	21FP4A	0Ω	1 Meg	Pin 6 †37Ω	Pin 10 #480KΩ	Pin 11 120KΩ	Pin 12 .1Ω			

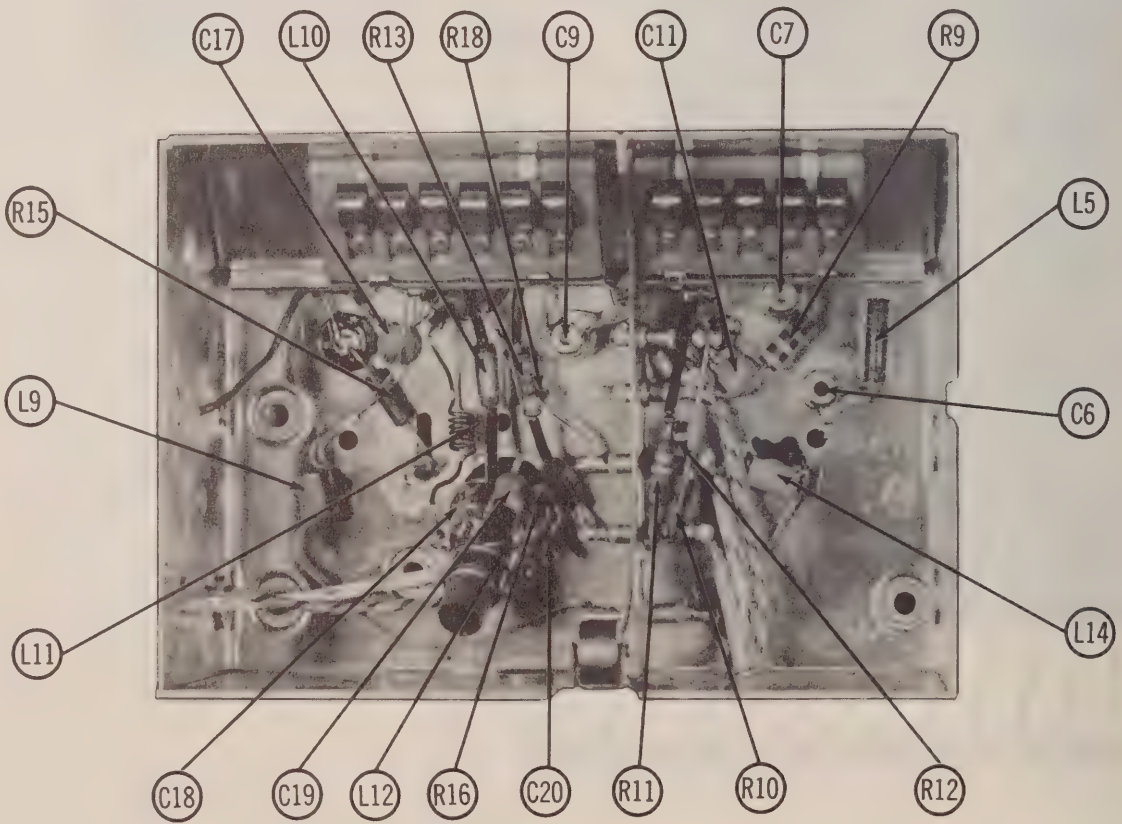
ALL CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED
NOISE LIMITING SWITCH IN OFF POSITION
† MEASURED FROM PINS 8 OF V24 & V25
# MEASURED FROM PIN 3 OF V22
■ MEASURED FROM 130VDC LINE



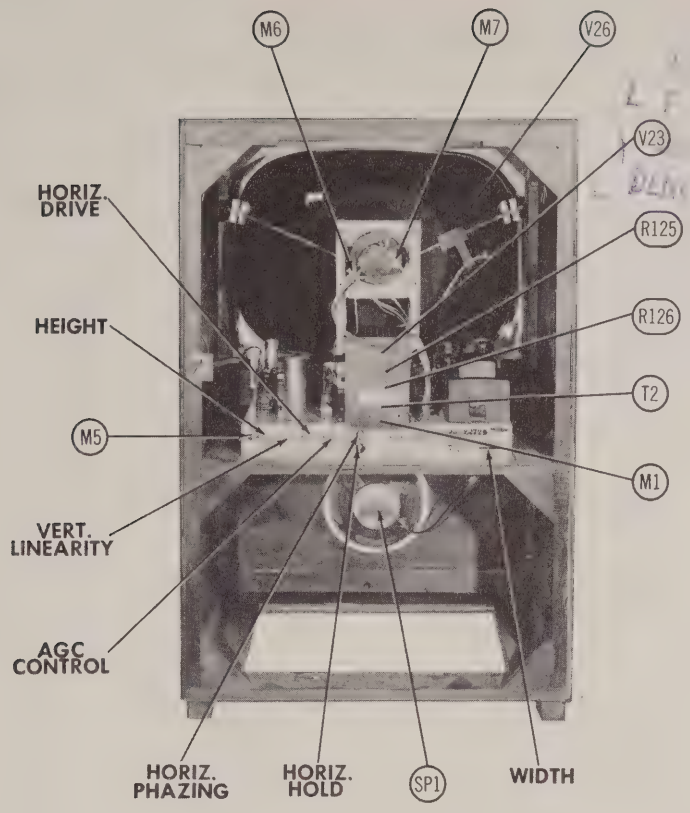
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

If horizontal hold is unsatisfactory make the follow adjustments:

1. Remove the horizontal discriminator tube (V19) from its socket and adjust the horizontal frequency slug (B1) until picture moves slowly from side to side with one vertical blanking bar.
2. Replace V19 and picture should fall into sync as soon as tube reaches operating temperature.
3. Check the horizontal phasing. By means of the centering control move the raster to the left so that the right hand edge of the raster is visible. Reduce the contrast and increase the brightness until the blanking bar is visible at the right hand edge of picture. The bar should be approximately 3/16 inch to 1/4 inch in width. If necessary, adjust the horizontal phasing slug (B2) for this condition. If considerable adjustment of B2 is required it may be necessary to readjust B1 as in step 1, above.

Adjust the horizontal drive control for maximum scan. If vertical white lines appear at center of picture, back off the horizontal drive control, slightly, to eliminate them.

Adjust the width slug (B3) for a picture slightly wider than necessary to fill the picture mask.

AGC ADJUSTMENT

This control is factory adjusted to provide 100 volt peak to peak signal at the output of the sync amplifier, and should give satisfactory reception under most conditions. If advanced too far clockwise, overloading of the video amplifier may occur or, on strong signals, blocking may occur when the Noise Limiting Switch is in the "ON" position.

DISASSEMBLY INSTRUCTIONS

1. Remove 6 push on type control knobs from front panel.
2. Remove 7 wood screws . Remove rear cover.
3. Disconnect built-in antenna and speaker.
4. Remove 2 wood screws. Remove antenna bracket.
5. Remove 6 chassis bolts. Remove chassis.
6. Remove 4 speaker nuts. Remove speaker.

NOTE: FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE CHASSIS AS OUTLINED ABOVE.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: CAPEHART Part No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amplifier	6BQ7	6BQ7	9AJ	
V2	Converter	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	4th. Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Amplifier 1st. Sound IF Amp.	6X8	6X8	8AK	
V8	Video Output	6AQ5	6AQ5	7BE	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	2nd. Sound IF Amp.	6AU6	6AU6	7BK	
V11	Ratio Detector	6AL5	6AL5	6BT	
V12	A.F Amplifier - AGC Clamper	6AV6	6AV6	7BT	
V13	Audio Output	6AQ5	6AQ5	7BE	
V14	Sync Amplifier	6BA6	6BA6	7BK	
V15	Sync Separator	6BE6	6BE6	7CH	
V16	Sync Clipper - Horiz. AFC	12AT7	12AT7	9A	
V17	Vert. Mult.	6C4	6C4	6BG	
V18	Vert. Mult. - Vert. Output	6V6GT	6V6GT	7AC	
V19	Horiz. Disc	6AL5	6AL5	6BT	
V20	Horiz. Oscillator - Horiz. Discharge	12AU7	12AU7	9A	
V21	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V22	Damper	6W6GT	6W6GT	6CG	
V23	HV Rectifier	1B3GT	1B3GT	5C	
V24	LV Rectifier	5U4G	5U4G	5T	
V25	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: CAPEHART Part No.	REPLACEMENT DATA: SYLVANIA Part No.	RTMA BASE TYPE	NOTES
V26A	21FP4A	21FP4A 21FP4 ①	12C	① Circuit changes necessary
B	17LP4	17LP4	12C	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CAPEHART Part No.	REPLACEMENT DATA: AEROVOX Part No.	REPLACEMENT DATA: CENTRALAB Part No.	REPLACEMENT DATA: CORNELL-DUBILIER Part No.	REPLACEMENT DATA: ERIE Part No.	REPLACEMENT DATA: MALLORY Part No.	REPLACEMENT DATA: SPRAGUE Part No.	NOTES
C1A	▲80	400	750090B-34	AFH2-64		UP8445	FP266	TVL-2675		
B	▲40	400		PRS50/100		BRH50I	TC350I	UVA-I310		
C	▲100	50								
C2A	▲80	400	750090B-33	AFH3-46		UPT84245	FP378	TVL-4659		
B	▲40	350		PRS25/10		BRI02A	TC22			
C	▲10	350								
D	10	25								
C3A	▲40	350	750090B-36	AFH3-140		UPT4145-V10	FP385	TVL-4606		
B	25	25		PRS25/35		BR252A	TC256			
C	▲10	350								
D	▲100	25								
C4	5	150	650228A-10	PR8150/4		BR415	TC40	TVA-1402		
C5	2	150	650228A-11	PR8150/4		BR245	TC40	TVA-1402		
C6	3-8				829-10					
C7	3-8				829-10					
C8	10			SU10	D6-100	TM5QI	GP1K-100	UC-541	5GA-QI	Note 1
C9	5-3				829-3			CT565A		
C10	120			SU20	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	Note 2
C11	1000		450468A-5	BPD-001	D6-102	TM5D1	B01-001	DC-521	5HK-D1	
C12	2.2				TCZ-2.2		NP0K-2R2		5TCCB-V22	Note 7
C13	47			SI47	D8-470		GP1K-470	UC-5447	5GA-Q47	
C14	5-3				829-3			CT565A		
C15	10			SU10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-QI	Note 3
C16	5			SI5	TCZ-4.7		GP1K-050	ZT-555	5GA-Q5	Note 1
C17	1000		450468A-5	BPD-001	D0-102	TM5D1	B01-001	DC-521	5HK-D1	
C18	1000		450468A-5	BPD-001	D0-102	TM5D1	B01-001	DC-521	5HK-D1	
C19	6.8			SI6.8NP0	TCZ-6.8		NP0K-6R8	ZT-5586	5TCCB-V68	Note 1
C20	1000		450468A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C21	1000		450468A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C22	1000		450468A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C23	1000		450468A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C24	1000		450468A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C25	1000		450468A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C26	1000		450468A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C27	.047	600	2248-1040	P288-1	DF-104	PJT2P1		PT401	2TM-P1	
C28	1000		450469A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C29	1000		450468A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C30	1000		450468A-1	BPD-005	DD-502	TM5D5	81I-005	DC-525	5HK-D5	
C31	1000		450469A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C32	1000		450469A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C33	1000		450468A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C34	1000		450469A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C35	1000		450469A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C36	1000		450468A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C37	1000		450468A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C38	100			SU100N75	TCN-100			NT-531	5TCN-Q1	
C39	.1	600	2248-1040	P288-1	DF-104	PTP6P1		PT601	6TM-P1	
C40	68		650030A-15				N150I-680			
C41	.1	600	2248-1040	P288-1	DF-104	PTE6P1		PT601	6TM-P1	
C42	.1	200	2248-1040	P288-1	DF-104	PJT2P1		PT401	2TM-P1	
C43	.1	200	2248-1040	P288-1	DF-104	PJT2P1		PT401	2TM-P1	
C44	.047	600	2248-4730	P688-047	DF-503	PTE6S22		PT6122	6TM-S22	
C45	.022	600	2248-2230	P688-022	DF-203	PTE6S22	GP2-333-103	PT611	6TM-S1	
C46	.01	600	2248-1030	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	Note 7
C47	100		650030A-14	SU100	D6-101	TM5T1	GP1K-101	NC-531	5GA-T1	
C48	5000		450469A-1	BPD-005	DD-502	TM5D5	81I-005	DC-535	5HK-D5	
C49	10		650030A-16				N150K-100			
C50	47		650030A-17	SI47N750	TCN-47			NT-5447	5TCU-Q47	
C51	5000		450468A-1	BPD-005	DD-502	TM5D5	81I-005	DC-535	5HK-D5	

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CAPEHART Part No.	REPLACEMENT DATA: AEROVOX Part No.	REPLACEMENT DATA: CENTRALAB Part No.	REPLACEMENT DATA: CORNELL-DUBILIER Part No.	REPLACEMENT DATA: ERIE Part No.	REPLACEMENT DATA: MALLORY Part No.	REPLACEMENT DATA: SPRAGUE Part No.	NOTES
C52	5000		450469A-1	BPD-005	DD-502	TM5D5	81I-005	DC-525	5HK-D5	Note 7
C53	1000	500	650263A-12	1464-001		2R5D1		MCB255	MS-21	
C54	.001	500	2248-1020	P688-001	D6-102	PTE5D1	GP2L-102	PT621	6TM-D1	
C55	.0047	600	2248-4720	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C56	.01	600	2248-1030	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C57	.1	200	2248-1040	P288-1	DF-104	PJT2P1		PT401	2TM-P1	
C58	.0047	600	2248-4720	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C59	.01	600	2248-1030	P688-01	D6-102	PTE6S1	GP2-333-103	PT611	6TM-S1	
C60	.01	600	2248-1030	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C61	100	500	2272-2101	1468-0001	D6-101	5W5T1	GP1K-101	MC235	1FM-31	
C62	.047	600	2248-4730	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	Note 4
C63	.1	200	2246-1040	P288-1	DF-104	PJT2P1		PT401	2TM-P1	
C64	.047	600	2248-4730	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C65	390	500	2272-21391	1469-0004		5R5T4		MCB243	MS-34	
C65A	.002			P688-002		PTE5D2		PT625		
B	.005		4532I4A-1	P688-005	▲PC-100	PTE6D5	◆1405-01	PT625	◆101C1	
C	.005			P688-005		PTE6D5		PT625		
C67	.001	600	2248-1030	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C68	.033	600	2248-3339							
C69	.022	600	2248-2230	P688-022	DF-203	PTE6S22		PT6122	6TM-S22	
C70	.1	600	2248-1040	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C71	.022	600	2248-2230	P688-022	DF-203	PTE6S22		PT6122	6TM-S22	
C72	.0022	1000	2242-2220	P1088-0022		PTE5D22		PT6222	MB-D22	
C73	.0022	600	2248-2220	P688-0022	D6-222	PTE6D22	GP2-333-222	PT6222	6TM-D22	
C74	.001	600	2248-1020	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C75	390	500	2272-21391	1469-0004		5R5T4		MCB243	MS-34	
C76	.068	200	22246-6839							
C77	470	1000	2272-21471					MCE347		
C78	100	500	2272-23101	1468-0001	D8-101	5W5T1	GP1K-101	MC235	1FM-31	
C79	.0047	600	2248-4730	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C80	.047	600	2248-4730	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C81	.22	200	2246-2240	P488-22		PTE4P22		PT4025	2TM-P22	
C82	1000		450469A-7	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C83	1000		450468A-7	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	
C84	.0047	600	2248-4726							
C85	.022	600	2248-2230	P688-022	DF-203	PTE6S22		PT6122	6TM-S22	
C86	.0033	600	2248-3325							
C87	22	500	2272-23220	1469-000025		5R5Q25		MCB220	MS-425	
C88	.001	500	2248-1020	P688-001	D6-102	PTE5D1	GP2L-102	PT621	6TM-D1	
C89	.047	600	2248-4730	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C90	.01	500	2248-1030	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C91	820	500	2272-41821							
C92	.001	600	2248-1020	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C93	.047	300	2248-4730	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C94	.1	200	2246-1040	P288-1	DF-104	PJT2P1		PT401	2TM-P1	
C95	.22	400	2247-2240	P488-22		PTE4P22		PT4025	4TM-P22	
C96	.047	300	2248-4730	P688-047		PTE6S47		PT6147	6TM-S47	
C97	.01	500	2248-1030	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C98	.22	400	2247-2240	P488-22		PTE4P22		PT4025	4TM-P22	
C99	500	10000	650153B-2		HY20C	TV3-502	MM-C20TF	413-501	20DK-T5	
C100	1500		450469A-2	BPD-0015	DD-152	TM5D15	B01-0015	DC-5215	5HK-D15	
C101	1500		450468A-2	BPD-0015	DD-152	TM5D15	B01-0015	DC-5215	5HK-D15	
C102	1000		450469A-5	BPD-001	DD-102	TM5D1	B01-001	DC-521	5HK-D1	Note 6
C103	.001	600	2248-1020	P688-001	D6-102	PTE5D1	GP2L-102	PT621	6TM-D1	Note 5
C104	5000		450468A-1	BPD-005	DD-502	TM5D5	81I-005	DC-525	5HK-D5	

Note 1. Some Models use 10MMF in this application.
Note 2. Some Models use 47MMF in this application.
Note 3. Some Models use 20MMF in this application.
Note 4. Deflection chassis coded DI or D2 use .01MFD in this application (Part #2248-1030)
Note 5. Used in deflection chassis coded DI or D2 when vert. integrator unit is part #452265A-1
Note 6. Used in early production only
Note 7. Not used in all Models
* Items C66A, C66B, C66C, R87A, R87B, R87C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CAPEHART Part No.	REPLACEMENT DATA: IRC Part No.	REPLACEMENT DATA: CLAROSTAT Part No.	REPLACEMENT DATA: CENTRALAB Part No.	REPLACEMENT DATA: MALLORY Part No.	INSTALLATION NOTES
R1A	200KΩ	½	453II7C-1	Q7-373*			UF254L	Brightness - Panel
B	1.5Meg						UH28A	Volume - Rear
C	Switch						UB-27	Attach to R1B
R2A	1500Ω	½	453II8B-2	QIT-109	AG-11-8	B-6-8	U-8	Contrast
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A.
C	Switch		Not Req.	Not Req.	SWB-2	Not Req.	UB-27	Attach to R2A.
R3A	1Meg	½	453II5B-1	QII-137	AG-61-8	B-69	U-54	Vert. Hold
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A.
R4A	10KΩ	½	453I37A-1	QII-116	AG-37-8	AB-14	SU-20	AGC
B	Shaft		Not Req.	RQ	FK5-1/4	Not Req.	Not Req.	Attach to R4A
R5A	250KΩ	½	453II4A-1	QII-130	AG-55-8	AB-50	SU-46	Horiz. Drive
B	Shaft		Not Req.	Not Req.	FK3-1/4	AK-1	Not Req.	Attach to R5A.
R6A	5000Ω	2	450893A-1	W-3000	A43-5000		B5000L	Vert. Linearity-Wire Wound
B	Shaft		Not Req.	Not Req.	FK8-1/4		Not Req.	Attach to R6A
R7A	2.5Meg	½	452733A-1	QII-239	AG-84-8	AB-83	SU-585	Height
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R7A.

* CONCENTRIKIT EQUIVALENT - KIT K-2. BASE E ELEMENTS A SHAFT B11-129 & P1-118 (Panel). B13-139 & R2-204 (Rear) & SWITCH 76-2.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: CAPEHART Part No.	REPLACEMENT DATA: IRC Part No.	NOTES
R8	15KΩ			BTS-15K	
R9	47KΩ				
R10	33Ω				
R11	220KΩ			BTS-220K	
R12	180KΩ			BTS-180K	
R13	470Ω			BTS-470	
R14	15KΩ			BTS-15K	
R15	220KΩ				
R16	15KΩ				
R17	10KΩ			BTS-10K	
R18	4700Ω			BTS-4700	
R19	12KΩ		3229-123	BTS-12K	
R20	8200Ω		3229-832		
R21	47Ω		3229-470		
R22	3300Ω		3229-332	BTS-3300	
R23	4700Ω		3229-472	BTS-4700	
R24	220Ω		3229-221	BTS-220	
R25	12KΩ	½	3220-123	BTS-12K	
R26	47Ω	½	3229-470		
R27	3300Ω	½	3229-332	BTS-3300	
R28	5600Ω	½	3229-562		
R29	220Ω	½	3229-221	BTS-220	
R30	150Ω	½	3229-151	BTS-150	
R31	5600Ω	½	3229-562		
R32	220Ω	½	3229-221	BTS-220	
R33	150Ω	½	3229-151	BTS-150	
R34	4700Ω	½	3229-472	BTS-4700	
R35	10KΩ	½	3229-103	BTS-10K	
R36	12KΩ	½	3229-123	BTS-1200	
R37	1Meg	½	3229-105	BTS-1Meg	
R38	1Meg	½	3229-105	BTS-1Meg	
R39	680Ω	1	3232-681	BTA-680	
R40	18KΩ	½	3229-183	BTS-18K	
R41	3300Ω	2	3235-332	BTB-3300	

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: CAPEHART Part No.	REPLACEMENT DATA: IRC Part No.	NOTES
R42	1Meg	½	3229-105	BTS-1Meg	
R43	100KΩ	½	3229-104	BTS-100K	
R44	220KΩ	½	3229-224	BTS-220K	
R45	18KΩ	½	3229-183	BTS-18K	
R46	680KΩ	½	3229-684	BTS-680K	Note 1
R47	100KΩ	½	3229-104	BTS-100K	
R48	10KΩ	½	3229-103	BTS-10K	Note 2, Note 1.
R49	68Ω		3229-680		
R50	100Ω	½	3229-102	BTS-1000	
R51	1200 ⅝	½	3228-21	BTS-120 ⅝	
R52	68KΩ	½	3229-683	BTS-68K	
R53	6800Ω	½	3229-682	BTS-6800	
R54	680Ω	½	3229-681	BTS-6800	
R55	1Meg	½	3229-105	BTS-1Meg	
R56	10Meg	½	3229-106	BTS-10Meg	
R57	330KΩ	½	3229-334	BTS-330K	
R58	68KΩ	½	3229-683	BTS-68K	
R59	470KΩ	½	3229-474	BTS-470K	
R60	680Ω	1	3232-681	BTA-680	
R61	3000Ω	7	650101A-23	1-3/4A-2000	
R62	1000Ω	½	3229-102	BTS-1000	
R63	33KΩ	½	3229-333	BTS-33K	
R64	270KΩ ⅝	½	3228-274	BTS-270K ⅝	
R65	150KΩ ⅝	½	3228-154	BTS-150K ⅝	
R66	3.9Meg	½	3229-395	BTS-3.9Meg	
R67	820Ω	½	3229-821	BTS-820	
R68	3300Ω	½	3229-333	BTS-3300	
R69	10KΩ	½	3229-103	BTS-10K	
R70	3300Ω	½	3229-332	BTS-3300	
R71	10KΩ	½	3229-103	BTS-10K	
R72	47KΩ	½	3229-473	BTS-47K	
R73	10KΩ	1	3232-103	BTA-10K	
R74	22KΩ	2	3235-223	BTB-22K	
R75	330KΩ	½	3229-334	BTS-330K	
R76	4.7Meg	½	3229-475	BTS-4.7Meg	
R77	1.5Meg	½	3229-155	BTS-1.5Meg	Note 5.
R78	27KΩ	2	3235-272	BTB-27K	
R79	12KΩ	½	3229-123	BTS-12K	
R80	15KΩ	½	3229-153	BTS-15K	
R81	330KΩ	½	3229-334	BTS-330K	
R82	10KΩ	½	3229-103	BTS-10K	
R83	3.9Meg	½	3229-395	BTS-3.9Meg	
R84	10KΩ	½	3229-103	BTS-10K	
R85	22KΩ	2	3235-223	BTB-22K	
R86	22KΩ	2	3235-223	BTB-22K	
R87A	22KΩ			BTS-22K	
B	820Ω		4532I4A-1	BTS-8200	
C	8200Ω			BTS-8200	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: CAPEHART Part No.	REPLACEMENT DATA: IRC Part No.	NOTES
R88	470KΩ	½	3229-474	BTS-470K	
R89	620KΩ	½	3229-624	BTS-620K	
R90	68KΩ	½	3229-683	BTS-68K	
R91	100KΩ	½	3229-104	BTS-100K	
R92	47KΩ	½	3229-473	BTS-47K	
R93	12KΩ	½	3229-123	BTS-12K	
R94	120KΩ ⅝	½	3228-124	BTS-120K ⅝	
R95	10KΩ	½	3229-103	BTS-10K	
R96	560KΩ	½	3229-564	BTS-560K	
R97	2.2Meg	½	3229-225	BTS-2.2Meg	
R98	470Ω	½	3229-471	BTS-470	
R99	470Ω	½	3229-471	BTS-470	
R100	470Ω	½	3229-471	BTS-470	
R101	470KΩ	½	3229-474	BTS-470K	
R102	470KΩ	½	3229-474	BTS-470K	
R103	470KΩ	½	3229-474	BTS-470K	
R104	10KΩ	½	3229-103	BTS-10K	
R105	10KΩ	½	3229-103	BTS-10K	
R106	12KΩ	½	3229-123	BTS-12K	
R107	12KΩ	½	3229-123	BTS-12K	
R108	56000Ω	1	3232-563	BTA-5600	
R109	100KΩ	½	3229-102	BTS-1000	
R110	470Ω	½	3229-471	BTS-470	
R111	470KΩ	½	3229-474	BTS-470K	
R112	22KΩ	½	3229-223	BTS-22K	
R113	5600Ω	1	3232-562	BTA-5600	
R114	1Meg	½	3229-105	BTS-1Meg	
R115	120KΩ	½	3229-124	BTS-120K	
R116	6800Ω	½	3229-682	BTS-6800	
R117	1Meg	½	3229-105	BTS-1Meg	
R118	47Ω	½	3229-470		
R119	180Ω	2	3235-181	BW-2-180	
R120	10KΩ	2	3235-103	BTB-10K	
R121	470KΩ	½	3229-474	BTS-470K	
R122	1Meg	½	3229-105	BTS-1Meg	
R123	10KΩ	½	3229-103	BTS-10K	
R124	100KΩ	½	3229-104	BTS-1000	
R125	6.8Ω	4	6J0101A-22		
R126	330KΩ	½	3229-334		
R127	35000Ω	7	650101A-24	1 3/4A-3500	
R128	15KΩ	10	400106A-6	1 3/4A-15K	
R129	1750Ω	20	750288A-7	2D-1750	
R130	22000Ω	2	3235-322	BTB-2200	
R131	1 Meg	½	3229-105	BTS-1 Meg	
R132	10KΩ	½	3229-103	BTS-10K	Note 3
R133	10KΩ	½	3229-103	BTS-10K	Note 4
R134	1 Meg	½	3229-105	BTS 1 Meg	Note 4
R135	1 Meg	½	3229-105	BTS-1 Meg	Note 4

* Items R87A, R87B, R87C, C66A, C66B, C66C are combined in one unit.
Note 1. Not used in all models.
Note 2. Some models use a 100KΩ resistor in this application.
Note 3. Used in deflection chassis coded DI or D2 when vert. intergrator unit is part no. 452265A-1.
Note 4. Used only in deflection chassis coded DI or D2.
Note 5. Deflection chassis coded DI or D2 used a 3.9Meg resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: CAPEHART Part No.	REPLACEMENT DATA: STANCOR Part No.	REPLACEMENT DATA: MERIT Part No.	REPLACEMENT DATA: CHICAGO Part No.	REPLACEMENT DATA: TRIAD Part No.
T1	117VAC	600VC.T. ▲2.34A	5VAC .340ADC	6.3VAC ▲1.2A SEC. 4 6.3VAC ▲ 8A	75035IC-1				

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: CAPEHART Part No.	REPLACEMENT DATA: STANCOR Part No.	REPLACEMENT DATA: MERIT Part No.	REPLACEMENT DATA: CHICAGO Part No.	REPLACEMENT DATA: TRIAD Part No.	NOTES
T2	199Ω Tap ▲ 24Ω	10.7Ω Tap ▲ .7Ω, 8.7Ω SEC. #2 .01Ω	850220D-1					Horiz. Output Trans.
T3	440Ω	15Ω	750354B-1	A-8115 ①	A-3038	TSO-5	A-99X	Vert. Output Trans.
T4A	200Ω		850221B-1	DY-9 ②	MDF-70 ②	TY-3 ②	Y-17 ②	Horiz. Deflection Coils.
B	48Ω							Vert. Deflection Coils.

① Drill new mounting holes.
② Drill one new mounting hole.
③ Use original deflection network.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: CAPEHART Part No.	REPLACEMENT DATA: STANCOR Part No.	REPLACEMENT DATA: MERIT Part No.	REPLACEMENT DATA: CHICAGO Part No.	REPLACEMENT DATA: TRIAD Part No.	NOTES
T5	10KΩ	3.4Ω	435Ω .49Ω	650216A-1	A-3879 ①	A-2900 ①	RO-16 ①	S-11X ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: CAPEHART Part No.	REPLACEMENT DATA: JENSEN Part No.	REPLACEMENT DATA: QUAM Part No.	NOTES
SP1	8"	PM	3.4Ω	75015IA-3	ST-115 Mod. P8-V	8A21	

CAPEHART MODELS 1T172M, 2C172M (Ch. CT-52), 3C212B, M, 4H212B, M, 5F212M, 6F212B, 7F212M, 8F212B, 9F212M (Ch. CT-57)

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE @ CURRENT 1000 ~	CAPEHART PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.340A	37.4Ω	1HY	650587C-1	C-2328		TR-1733 ①	C-17X ①

① Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		IRC PART No.	NOTES
		PRI.	SEC.	CAPEHART PART No.	MERIT PART No.		
L2	IF Trap	0Ω					Wound on 68 MMF capacitor.
L3	IF Trap	0Ω					Wound on 68 MMF capacitor.
L4	Ant. Coils	0Ω					
L5	IF Trap	1.1Ω					
L6	Neutralizing Coil	0Ω					
L7	Fil. Choke	0Ω					
L8	RF Mixer Grid & Osc. Coils	0Ω					
L9	Fil. Choke	0Ω					
L10	Feedback Coil	.8Ω					
L11	RF Choke	0Ω					
L12	Conv. Plate	0Ω	0Ω				
L13	1st Video IF	.3Ω		650590B-1			
L14	Fil. Choke	0Ω		4522667B-1			.8 Microheneries.
L15	2nd Video IF	.1Ω	.1Ω	750349B-1			Includes Trap
L16	3rd Video IF	.1Ω	.1Ω	750349B-1			Includes Trap
L17	4th Video IF	.1Ω	.1Ω	750349B-1			Includes Trap
L18	Fil. Choke	0Ω		452667B-1			.8 Microheneries.
L19	RF Choke	1.8Ω		450338A-4		CLA	2.2Microheneries.
L20	RF Choke	1.8Ω		450338A-4		CLA	2.2Microheneries
L21	Series Peaking Coil	3.6Ω		650585A-1	TV-181		75Microheneries
L22	Shunt Peaking Coil	6Ω		650585A-2	TV-185		250Microheneries.
L23	4.5MC Trap	1.4Ω		453225A-1	TV-151■		11.2Microheneries.
L24	Series Peaking Coil	4.6Ω		650585A-8	TV-181 *		115 Microhenries, wound on 3.9KΩ resistor
L25	4.5MC Trap	2.3Ω		650591A-2	TV-151		
L26	Series Peaking Coil	4Ω		650585A-9	TV-181		120 Microheneries
L27	Shunt Peaking Coil	4.3Ω		650585A-4	TV-181		100Microheneries
L28	Sound IF	4.6Ω		650591A-3	TV-151		
L29	Ratio Det.	5.5Ω	1.8CT	650584A-1	TV-115		Tertiary Winding-.6Ω
L30	Horiz. Osc. Coil	95Ω	75Ω	750352B-1			Sec. tap @ 36Ω, feedback winding 20Ω
L31	Horiz. Ring Coil	22Ω					11 Millihenries
L32	Width Coil	.8Ω	94Ω	650589B-1			

* Parallel with 3.9KΩ resistor
■ Drill mounting hole.

FUSES

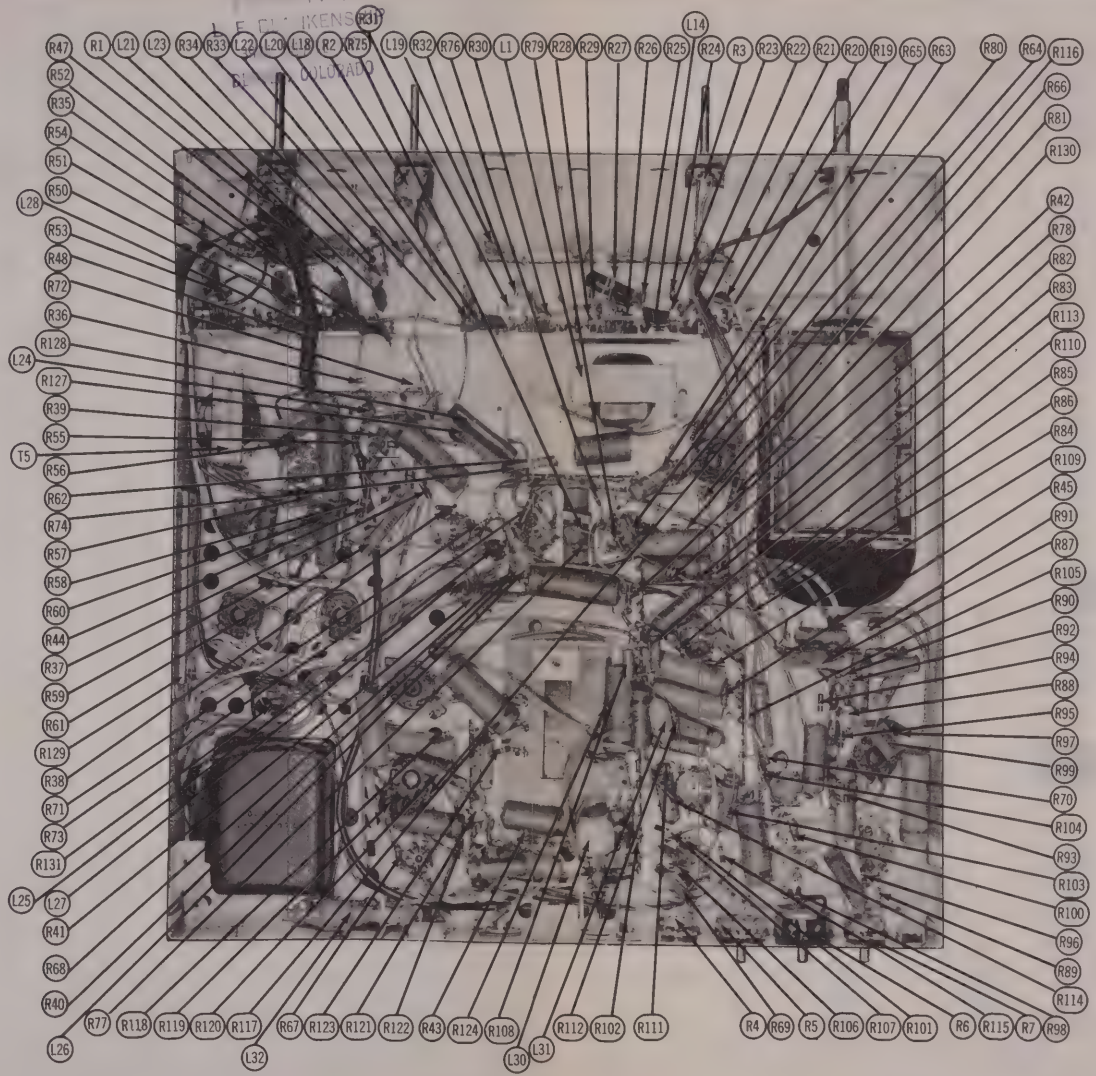
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			CAPEHART PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG Pigtail	1/4A. 250V.	450183A-1		318.250		GJV-1/4	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					CAPEHART PART No.		
M2	Bayonet	6-8	.15	Brown	600093A-8		Type #47

MISCELLANEOUS

ITEM No.	PART NAME	CAPEHART PART No.	NOTES
M3	RF Tuner	850222B-1	
M4	5th. Video IF Capacitor		8MMF
	Crystal		1N64
	Capacitor		10 MMF
	RF Choke		36 Microhenries
	RF Choke		4 Microhenries
			Video Det. Assembly Complete Part #750350B-1
M5	Switch	453166A-1	Noise Limiting
M6	Cente ring Magnet	650417A-2	
M7	Ion Trap	650276A-6	
	Knob	650594B-2	Channel Selector
	Knob	650593B-1	Fine Tuning
	Knob	650593B-2	Brightness
	Knob	650592B-1	Vert. Hold
	Knob	650592B-2	Contrast
	Knob	650594B-1	Off/on Volume
	Back Cover	453143A-G1	Models 1T172M & 2C172M
	Back Cover	453139A-G1	Models 3C212M & 3C212B
	Back Cover	453176A-G1	Models 4H212M, 4H212B, 5F212M, 6F212B, 7F212M, 8F212B 9F212M
	Mask	453174A-G5	Models 1T172M & 2C172M
	Mask	453174A-G6	Model 3C212M
	Mask	950159A-1	Model 3C212B
	Mask	453174A-G7	Models 4H212M, 5F212M, 7F212M & 9F212M
	Mask	950159A-3	Models 4H212B, 6F212B & 8F212B
	Safety Glass	850223A-1	Models 1T172M & 2C172M
	Safety Glass	850223A-2	Models 3C212M & 3C212B
	Safety Glass	850223A-3	Models 4H212M, 4H212B, 5F212M, 6F212B, 7F212M, 8F212B & 9F212M



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

DUKANE MODEL 4C25

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST
DENVER, COLORADO

DUKANE
MODEL 4C25

DUKANE
MODEL 4C25

TRADE NAME	Dukane Model 4C25 Flexiphone
MANUFACTURER	Dukane Corp, St. Charles, Ill.
TYPE SET	AC-DC Operated Intercommunication System Master Unit
TUBES (TWO)	Types 12AX7 AF Amp., 50C5 Audio Output
POWER SUPPLY	110-120 Volts AC-DC RATING .20 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

DUKANE
MODEL 4C25

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		DUKANE PART No.	STANDARD REPLACEMENT		
V1	AF Amplifier	262-12AX7	12AX7	9A	
V2	Audio Output	262-50C5	50C5	7CV	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	DUKANE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲40	150	199-2915	AFH4-28		UP44315C		FP409	TVL-4420	
B	■40	150								
C	▲30	150								
D	20	25								
C2	20	150	199-2016-206	PRS150/20		BR2015A		TC45	TVA-1410	
C3	.003	600	199-4030-302	P688-003	D6-302	PTE6D3	GP2-333-302	PT623	6TM-D3	
C4	250	500	199-3001-251	1468-00025	D6-251	5W5T25	GP2K-251	MC240	1FM-325	
C5	350	500	199-3001-351	1468-00035	D6-351		GP2K-351		1FM-335	
C6	500	500	199-3001-501	1468-0005	D6-501	5W5T5	GP2K-501	MC245	1FM-35	
C7	.001	600	199-4030-102	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C8	.01	400	199-4020-103	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C9	.006	600	199-4030-602	P688-006	D6-602	PTE6D6	GP2-333-602	PT626	6TM-D6	
C10	.006	600	199-4030-602	P688-006	D6-602	PTE6D6	GP2-333-602	PT626	6TM-D6	
C11	.05	400	199-4021-503	P488-05		PTE4S5		PT415	4TM-S5	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	DUKANE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	100KΩ	½	601-34	Q13-128	AG-51-Z	AB-41	U-39	Volume
B	Shaft		Not Req.	Not Req.	RS-2	AK-1	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWB	KB-1	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	DUKANE PART No.	IRC PART No.	
R2	270Ω	1	600-0116-271	BTA-270	
R3	68KΩ	½	600-0043-683	BTS-68K	
R4	68KΩ	½	600-0043-683	BTS-68K	
R5	100KΩ	1	600-0116-104	BTA-100K	
R6	100KΩ	1	600-0116-104	BTA-100K	
R7	100KΩ	1	600-0116-104	BTA-100K	

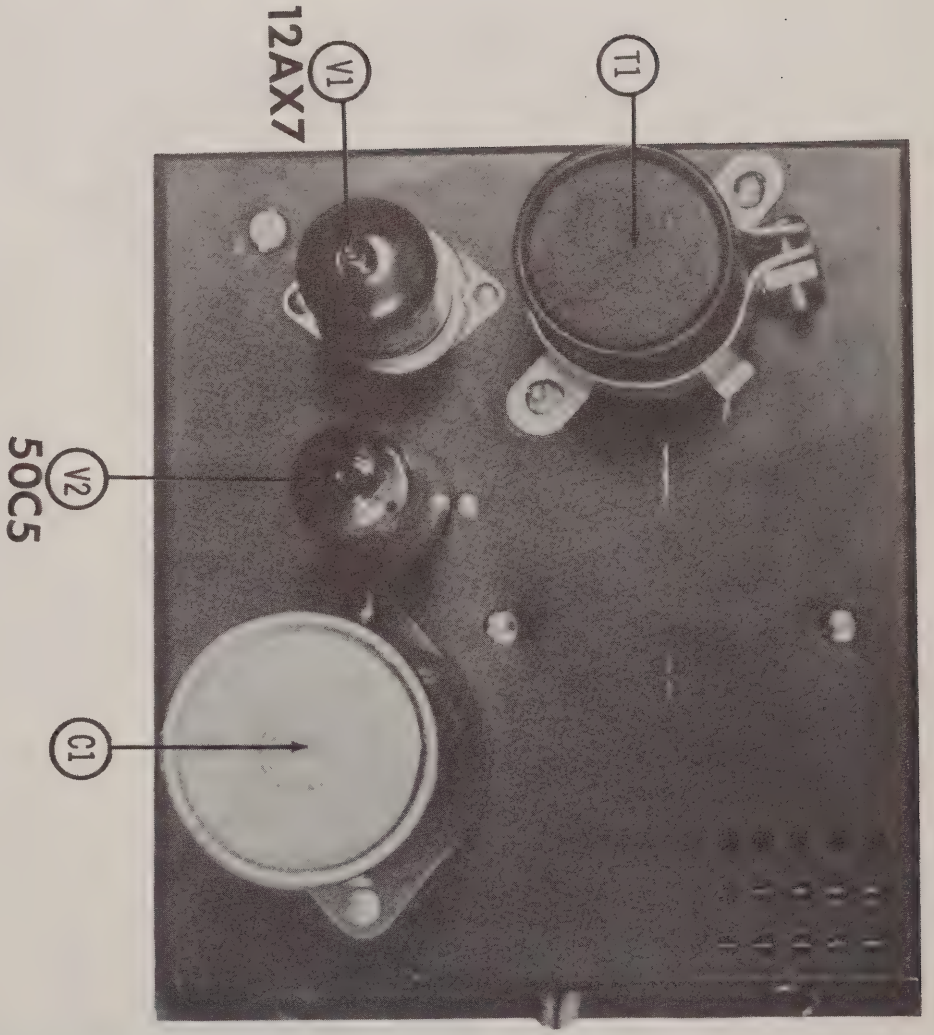
Note. Some models use a 2.5Meg resistor in this application.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	DUKANE PART No.	IRC PART No.	
R8	2.2Meg	½		BTS-2.2Meg	Note
R9	270Ω	1	600-0116-271	BTA-270	
R10	27KΩ	1	600-0116-273	BTA-27K	
R11	560Ω	1	600-0116-561	BTA-560	
R12	56Ω	1	600-0116-560		
R13	350Ω	10	600-9021	1 3/4A-350	

TRANSFORMER (INPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		DUKANE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T1			5.7Ω CT	2.1KΩ	710-3021					Turns Ratio 27 to 1

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

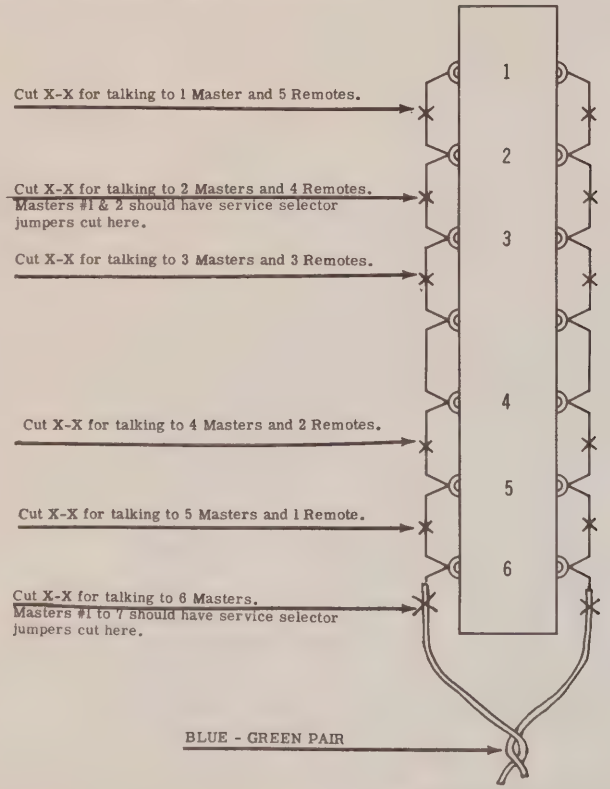
ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		DUKANE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T2	3KΩ		156Ω	4.7Ω	710-2035					

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT	DUKANE PART No.	SYLVANIA PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	
M1	.025	595-2	NC5	5M1	1004A	6S100	

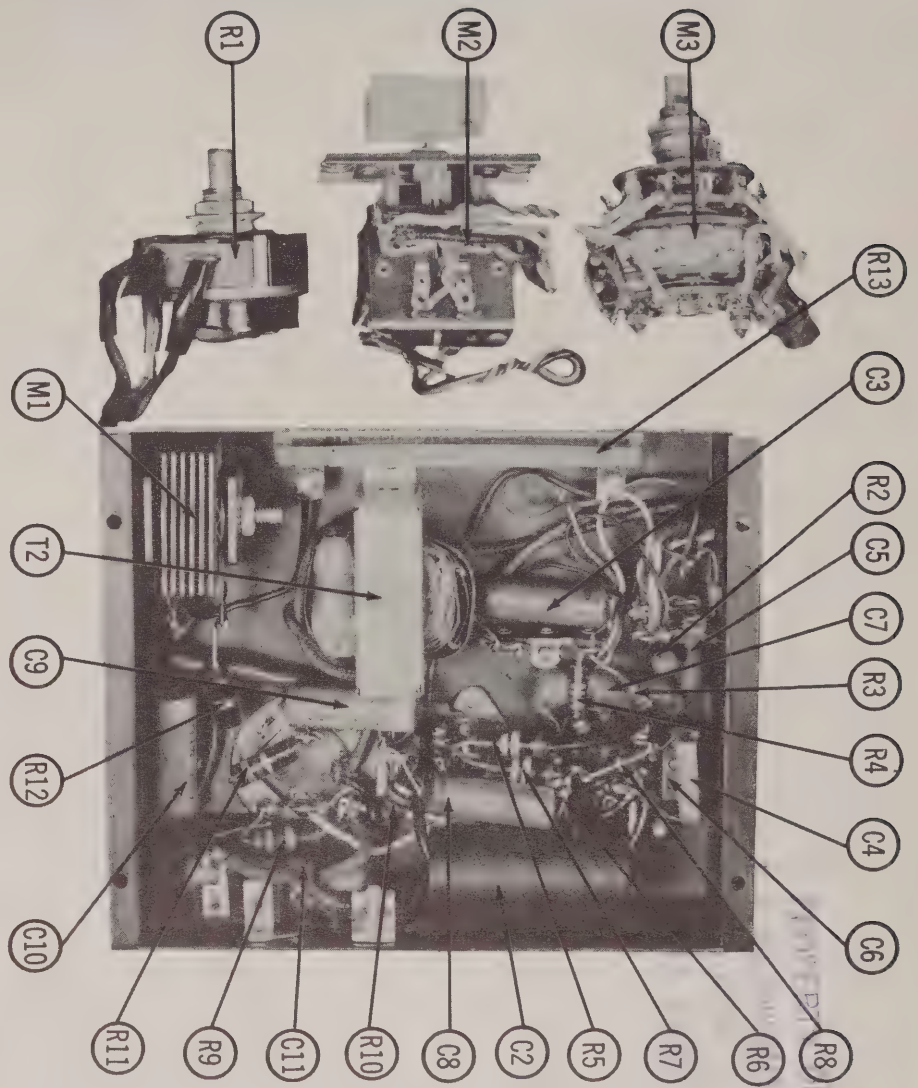
MISCELLANEOUS

ITEM No.	PART NAME	DUKANE PART No.	NOTES
M2	Switch	680-102	Talk-Listen
M3	Switch	680-103	Station Selector

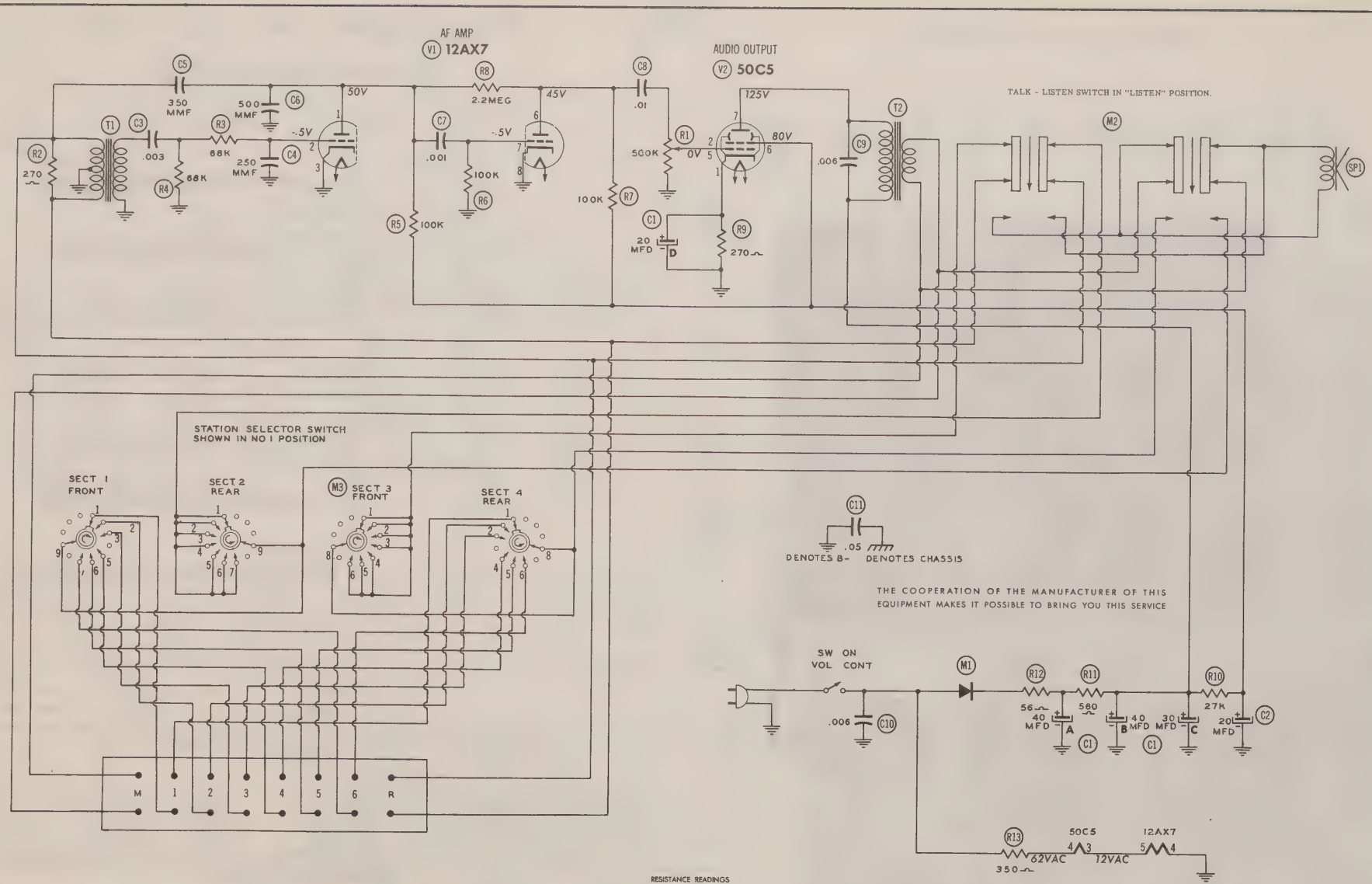

Cut X-X for talking to 1 Master and 5 Remotes.
Cut X-X for talking to 2 Masters and 4 Remotes. Masters #1 & 2 should have service selector jumpers cut here.
Cut X-X for talking to 3 Masters and 3 Remotes.
Cut X-X for talking to 4 Masters and 2 Remotes.
Cut X-X for talking to 5 Masters and 1 Remote.
Cut X-X for talking to 6 Masters. Masters #1 to 7 should have service selector jumpers cut here.
BLUE - GREEN PAIR
1
2
3
4
5
6

SERVICE SELECTOR SWITCH

CHASSIS—BOTTOM VIEW



DUKANE MODEL 4C25



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	†127KΩ	135KΩ	0Ω	0Ω	12Ω	†127KΩ	100KΩ	0Ω	6Ω
V 2	50C5	270Ω	6.5KΩ	12Ω	62Ω	6.5KΩ	†27KΩ	†770Ω		

STATION SELECTOR IN #1 POSITION
TALK & LISTEN SWITCH IN "LISTEN" POSITION
† MEASURED FROM OUTPUT OF M1

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

DUKANE MODELS
11A55FF, 11B55

Figure 1

GENERAL INFORMATION

The DuKane Models 11A55FF and 11B55 Tape Recorders are designed to magnetically record on a 5" or 7" reel of 1/4" wide tape, two tracks instead of one, which doubles the playing time.

Model 11A55 Fast Forward (FF) is electrically and mechanically equivalent to Model 11B55, but uses an outboard mounted 40 mfd. capacitor No. 199-2025-406 on the pre-amplifier chassis.

Using both channels of the tape, the recording time is as follows:

SIZE	TIME
5" reel	1/2 hour
7" reel	1 hour

The DuKane Models 11B55 and 11A55FF are designed to operate on 60 cycle, 115 volt AC supply.

NOTE: Severe damage may result if connection is made to a direct current (DC) line.

Manufactured by:

DuKane Corporation
St. Charles,
Illinois

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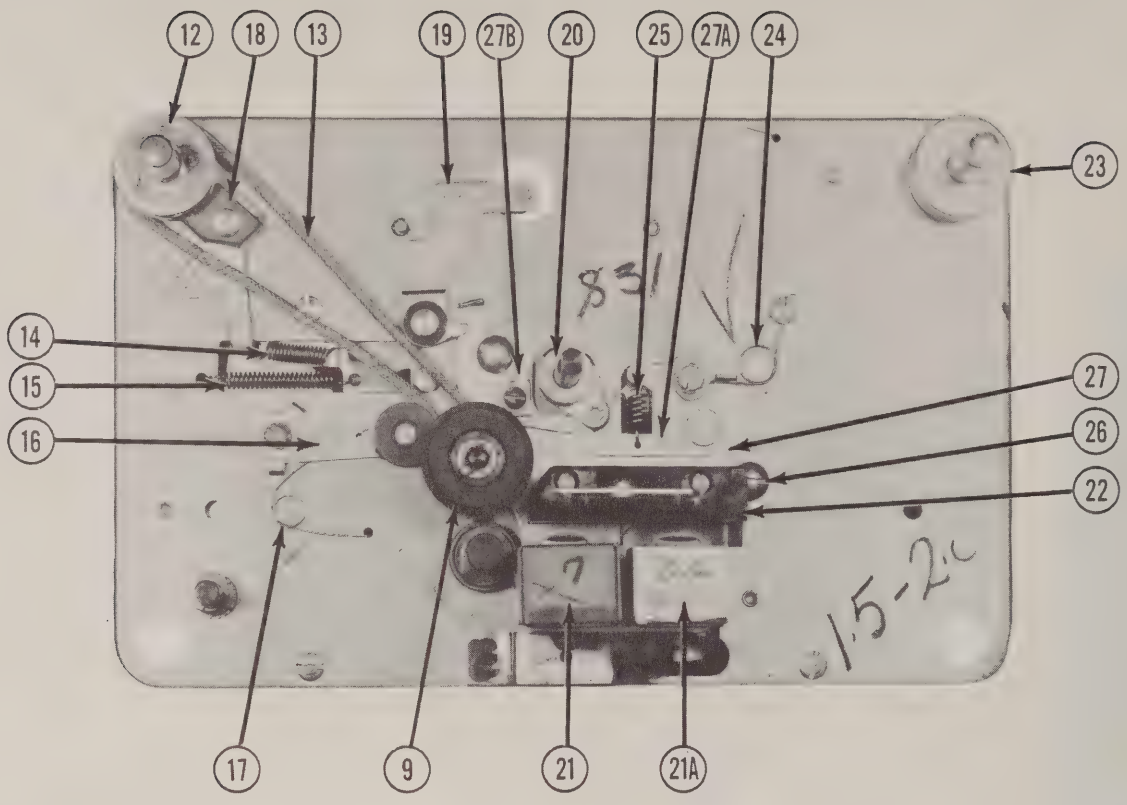


Figure 2

OPERATING INSTRUCTIONS

Preparing the DuKane for Recording -

1. Insert the line cord into a convenient wall receptacle of the proper rating.

2. Place a reel of tape on the right hand spindle in such a manner that when the tape is pulled, the reel will turn in a clockwise direction. Make sure that the reel is engaged with the drive pin on the spindle.

NOTE: This recorder uses Type "B" wound tape, i.e. the dull magnetic coated side faces outward. If the tape to be used is Type "A" (coated side facing inward) place the reel on the left hand spindle so that the tape will lead-off in a clockwise direction. Bring the tape behind the rear plate (3) (not through the head slot) directly to the empty reel on the right hand spindle. Place control knob (1) in "Rewind" and allow the full reel of tape to wind on the empty reel. The dull magnetic side of the tape now faces outward.

3. Place an empty reel on the left hand spindle.

4. Pull about two feet of tape from the supply reel and feed it through the recording head slot and then through one of the radial slots in the empty reel. Use a pencil to hold the tape in place and rotate the reel clockwise until the tape is secured to the reel.

5. Turn the "Off-On Volume Control" on. This supplies power to the entire recorder.

To Make a Recording -

1. Insert the microphone plug into the "Mic." jack.

2. Place the Play-Record Control in "Record" position.

3. Turn the "Volume" control clockwise until the incoming signal is sufficient to cause the Neon Level Lamp to flash on high peaks.

NOTE: Correct recording volume is very important. Too weak a signal, which does not cause the Level Lamp to flash, will result in weak playback and high background noise. Too strong a signal, causing the Lamp to glow constantly, will result in distortion during playback.

4. Turn the control knob (1) to "Forward" position. Any sound now entering the microphone will be recorded on the tape.

NOTE: Make sure the fast forward control knob (5) is in the "Out" position, if not the mechanism will not operate.

To Record Directly From Radio -

1. The special input cord, equipped with microphone plug and clips, is plugged into the "Mic." jack and clipped to the voice coil terminals of the speaker in the radio being used.

2. Tune in the radio program as usual but use only enough volume to hear the program clearly. Set the recorder volume control so that the Level Lamp

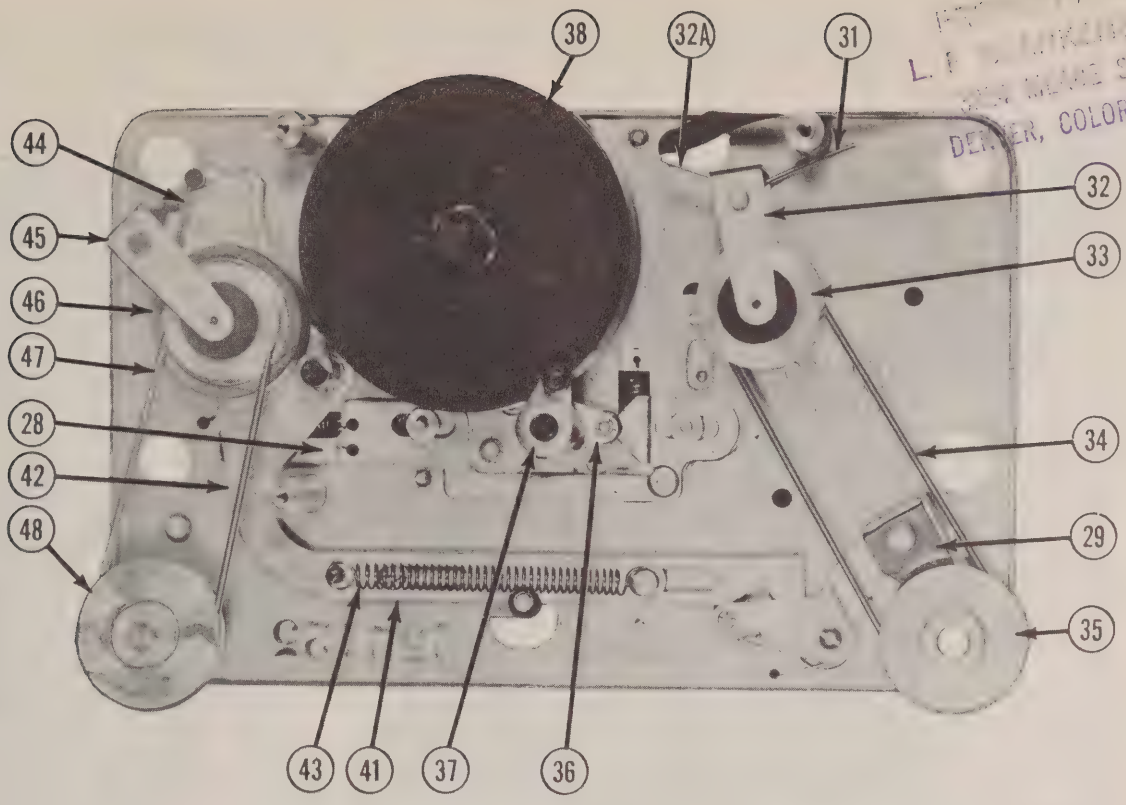


Figure 3

flickers occasionally, as when using a microphone.

3. Reverse the clips at the radio speaker if a test recording is not clear and relatively free of hum. It may be difficult or impossible to make clear, quiet recordings from some small AC-DC radio receivers.

To Stop the Recorder -

The recorder may be stopped at any time by turning the control knob (1) to "Stop". This stops the movement of the tape and shuts off the motor through the action of switch (50).

Two Track Recording -

1. The DuKane is designed for two channel recordings, therefore, after a reel of tape has been recorded, a second track may be recorded on the same reel.

NOTE: Recordings are made on 1/2 the tape width at a time; thereby, resulting in two track recordings.

2. A second recording can be made on the same tape by removing the reels from the recorder, turning them over, then placing the full reel on spindle (23) and the empty reel on spindle (12).

3. Thread the tape and proceed with the recording as previously described.

4. After the second track has been recorded, the first track is ready to be played without rewinding, by changing reels as described in step No. 2, above.

To Rewind the Tape -

1. Make sure the Play-Record control knob is in "Play" position.

2. Turn the control knob (1) to "Rewind".

To Play a Recording -

1. Make sure the Play-Record control knob is in "Play" position.

2. Turn control knob (1) to "Forward" position.

3. Set the volume and tone controls at desired levels.

Fast Forward -

1. This control operates only when control knob (1) is in the "Forward" position. Never attempt to operate the Fast Forward Knob (5) at any other time.

2. Control knob (1) will function normally only when the Fast Forward Knob (5) is in the "Out" position.

3. During the "Play Back", any portion of a recording may be skipped, or any recording on a tape may be located in a few seconds by pivoting the Fast Forward Knob in a clockwise direction. A few seconds of "Fast Forward" is equivalent to several minutes of playing time. The Fast Forward Knob has three positions:

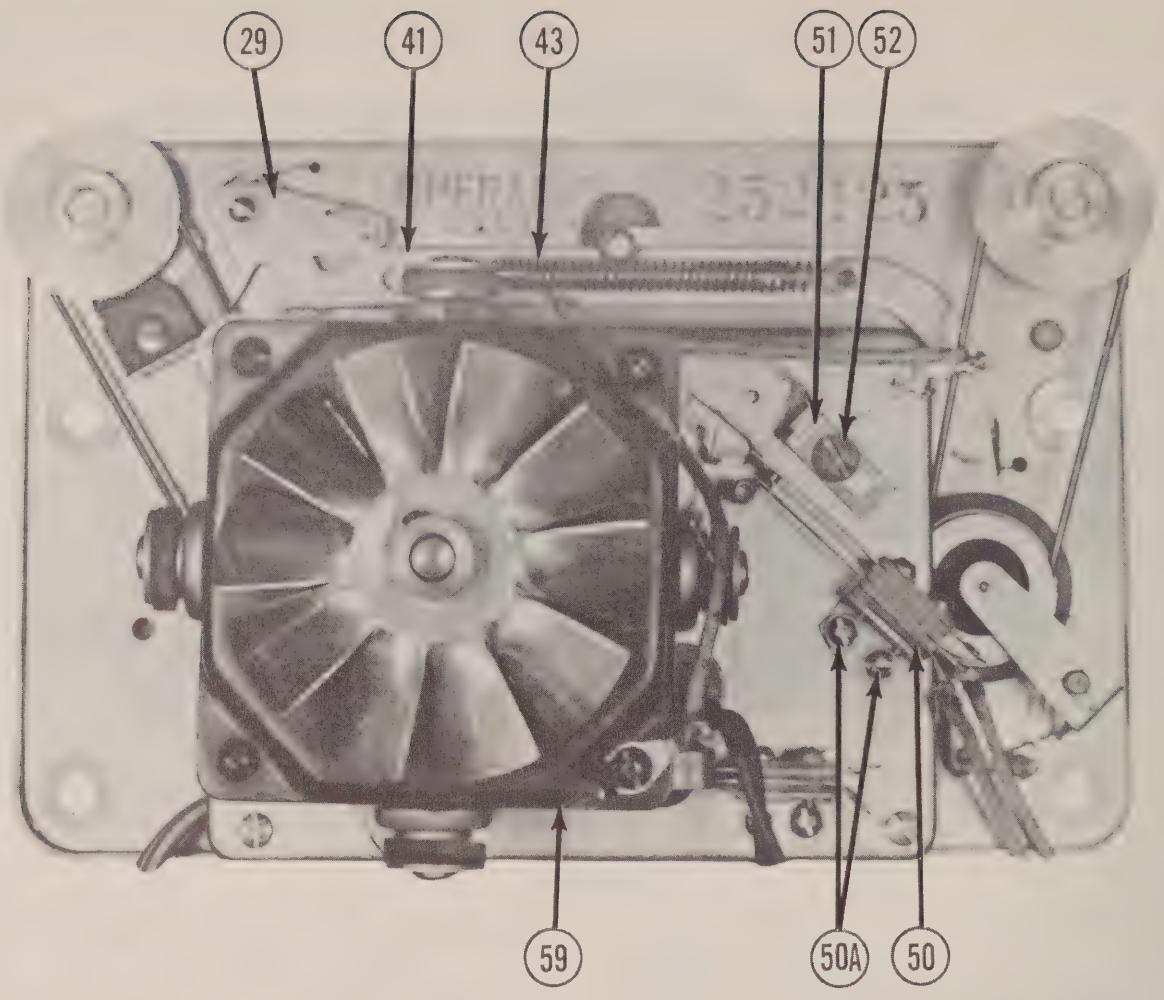


Figure 4

(a) Out at which position it must remain at all times, except for "Fast Forward".

(b) Pause is the mid-position that brakes the fast moving reels and stops all tape movement.

(c) In is the "Fast Forward" position.

To Play a Recording Through An External Amplifier -

1. A phono plug and shielded line can be used to connect from the "Phones" jack to the phono input of an external amplifier or public address system.

To Play a Recording Through An External Speaker -

1. An external speaker having a 3.4Ω voice coil may be plugged into the External Speaker jack, which is located on the rear of the cabinet. When an external speaker is plugged in, the internal speaker is automatically silenced.

ADJUSTMENTS

Motor Power Switch - (See Figure 4)

1. The Off-On Volume Control, when turned on, supplies power to the entire mechanism, however, the motor will not run until control knob (1) is turned to either "Forward" or "Rewind" position, causing motor switch (50) to make contact. The switch contacts should be open when the mechanism is in "Stop" position.

2. To adjust the motor switch, place the mechanism in the "Stop" position. Loosen the two screws (50A) and adjust the switch to the center of the bakelite pin on the motor swing plate (57). Continue to move the switch until there is approximately 1/16" gap between the contacts. Tighten the screws (50A).

The Forward Stop Lug -

The forward stop lug (51) should be set so that the motor swing plate assembly (57) comes to a rest against it as soon as the motor drive roller (58) makes firm contact with the flywheel (38). Excessive pressure against the flywheel will prevent the motor from starting when the mechanism is placed in "Forward" or "Rewind" position. Insufficient pressure will result in slippage, causing "Wow". Adjust the forward stop lug (51) 1/16" from the edge of the motor swing plate (57), at the point when the motor drive roller (58) begins to touch the flywheel (38).

There is no motor plate stop adjustment in the "Rewind" position; however, the rewind drive roller (33) is located in a hanger (32) whose position is adjusted

by bending lug (32A) against the swing plate bushing (56A) in a manner that will allow a clearance between the motor drive roller (58) and the rewind roller (33) in the "Stop" position. This will allow the motor drive roller (58) to engage the rewind drive roller (33) when the mechanism is in the "Rewind" position.

Pressure Lever and Arm Adjusting Plate - (See Figure 2)

Set the pressure lever (20), so that it is perpendicular to the pressure arm (27A) when the control knob (1) is in the "Forward" position. Also adjust the arm adjusting plate (27B) so it will clear the pressure arm (27A) by 1/64" when in this position.

Detent Lever (36) -

The roller of the detent lever (36) should be adjusted so that it will engage the detent, on the right end of the detent slide (28), when the control knob (1) is in the "Stop" position.

Motor Transfer Lever (37) -

The motor transfer lever (37) shoulf be adjusted with the mechanism in the "Stop" position. To adjust the transfer lever (37) loosen its set screws and move the motor swing plate (57) until the motor drive roller (58) is midway between the rewind drive roller (33) and the flywheel (38), then tighten the screws.

TROUBLES

Irregular Speed "Wow" -

1. Felt pressure pads in tape guide assembly (22) worn.

(a) Replace with new pads.

2. Oil or grease on drive roller (58), flywheel assembly (38), or pressure roller (9).

(a) Clean with alcohol.

3. Check pressure roller lever (20) to see if it is perpendicular to the pressure arm (27A) when mechanism is in the "Forward" position. See adjustments on "Pressure Lever and Arm Adjusting Plate".

4. Motor drive roller (58) or pressure roller (9) eccentric. Allow mechanism to run for twenty minutes. If, after this time, the rollers are still eccentric, replace with new rollers.

5. Motor shaft binding. The motor shaft should turn freely when control knob (1) is in the "Stop" position. Re-align bearings by tapping motor lightly with a wooden mallet.

6. Detent spring (15) not connected. See Figure 2. If detent spring (15) is not connected, the detent slide (28) will not be held against the detent lever (36) resulting in the motor drive roller (58) not being held in firm contact with the capstan.

Motor Runs But Mechanism Will Not Operate -

1. Motor transfer lever (37) not adjusted properly. See adjustments on "Motor Transfer Lever", and "The Forward Stop Lug".

2. Motor drive roller (58) defective.

3. Fast Forward control in "Pause" position.

(a) Turn control to "Out" position.

Mechanism Runs Forward But Will Not Rewind -

1. Check drive belt (34) for being loose or broken. Replace.

2. Motor transfer lever (37) not adjusted properly. See adjustment on "Motor Transfer Lever".

Mechanism Rewinds But Will Not Run Forward -

1. Forward stop lug (51) out of adjustment. See adjustment on "The Forward Stop Lug".

Control Knob (1) and Shaft Turn But Mechanism Fails to Run in Either Direction -

1. Motor transfer lever (37) loose on shaft. Readjust as described under "Motor Transfer Lever".

Mechanism Fails to Run in Fast Forward -

1. Check drive belt (47) to see if loose or broken.

2. Control knob (1) not in the "Forward" position.

LUBRICATION

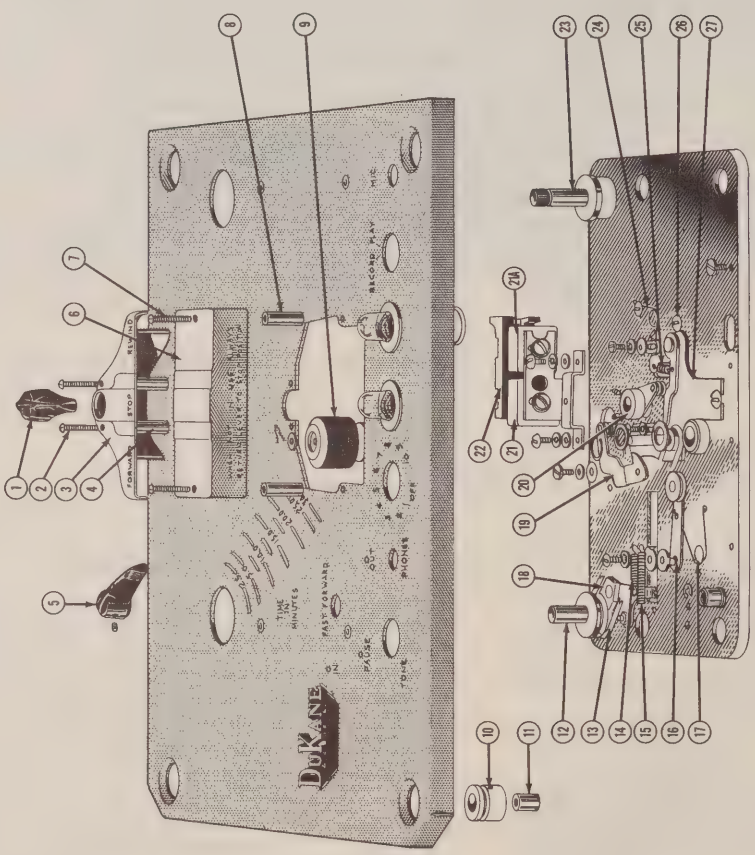
All moving parts of this recorder are located in either sealed ball bearings or self lubricated oilite bearings; therefore, no lubrication is required. Any excess oil seeps to the outer edges of the moving parts causing slippage in the drive mechanism. Should this occur, wipe off all parts thus affected, with a clean, soft cloth.

CLEANING

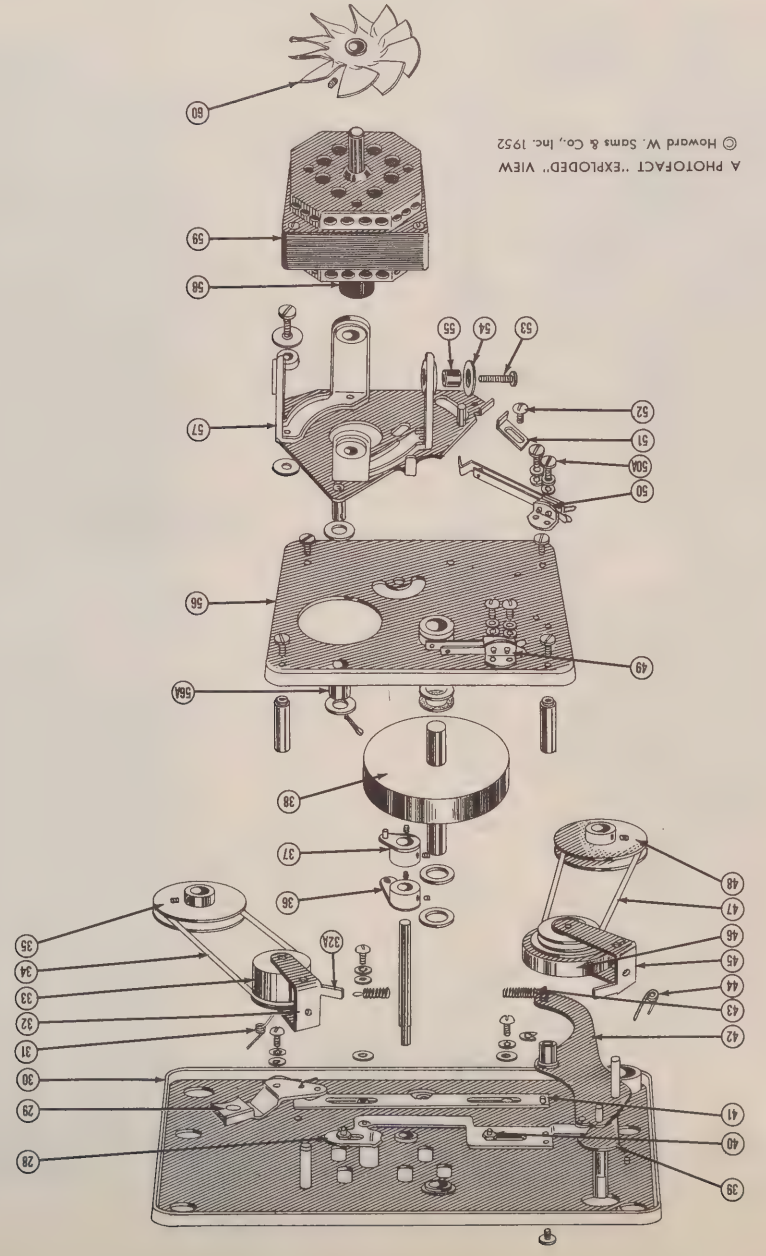
The recording head (21), erase head (21A), tape guide assembly (22), pressure roller (9) and the capstan are subject to an accumulation of tape coating residue, which is worn off the tape as it passes these parts. To remove this accumulation proceed as follows:

Remove the two screws that hold the front plate (6) in place. Keep control knob (1) in the "Off" position. Use a small brush or soft cloth dipped in carbon tetrachloride to clean the recording and erase head laminations.

Next, turn on the power and place control knob (1) in the "Forward" position. Use a soft cloth dipped in carbon tetrachloride to wipe off all foreign matter from the capstan and pressure roller while they are revolving.


RECORD PLAY
MIC
REWIND
STOP
FORWARD
TIME MINUTES
FAST FORWARD
PAUSE
TONE
OUT PHONES
OFF
DUKANE

L. F. BLANKEN
3924 MEADE ST.
DENVER, COLORADO



A PHOTOFACT "EXPLODED" VIEW
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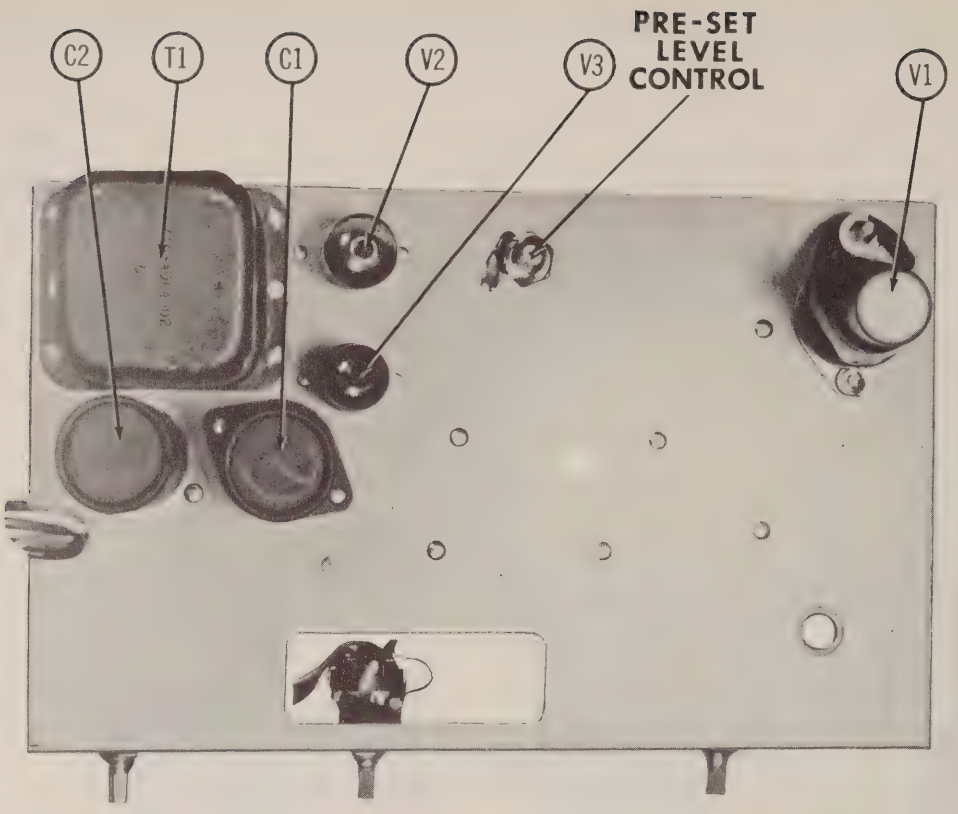


Figure 5

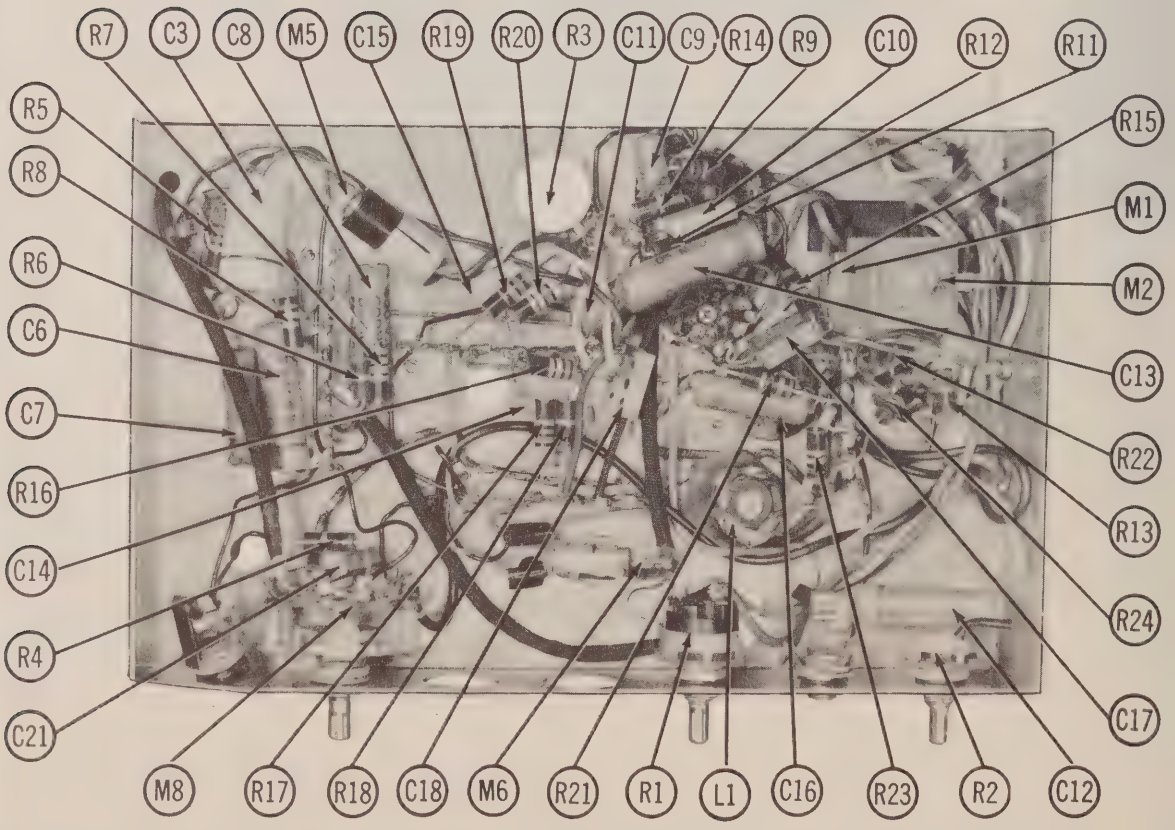


Figure 6

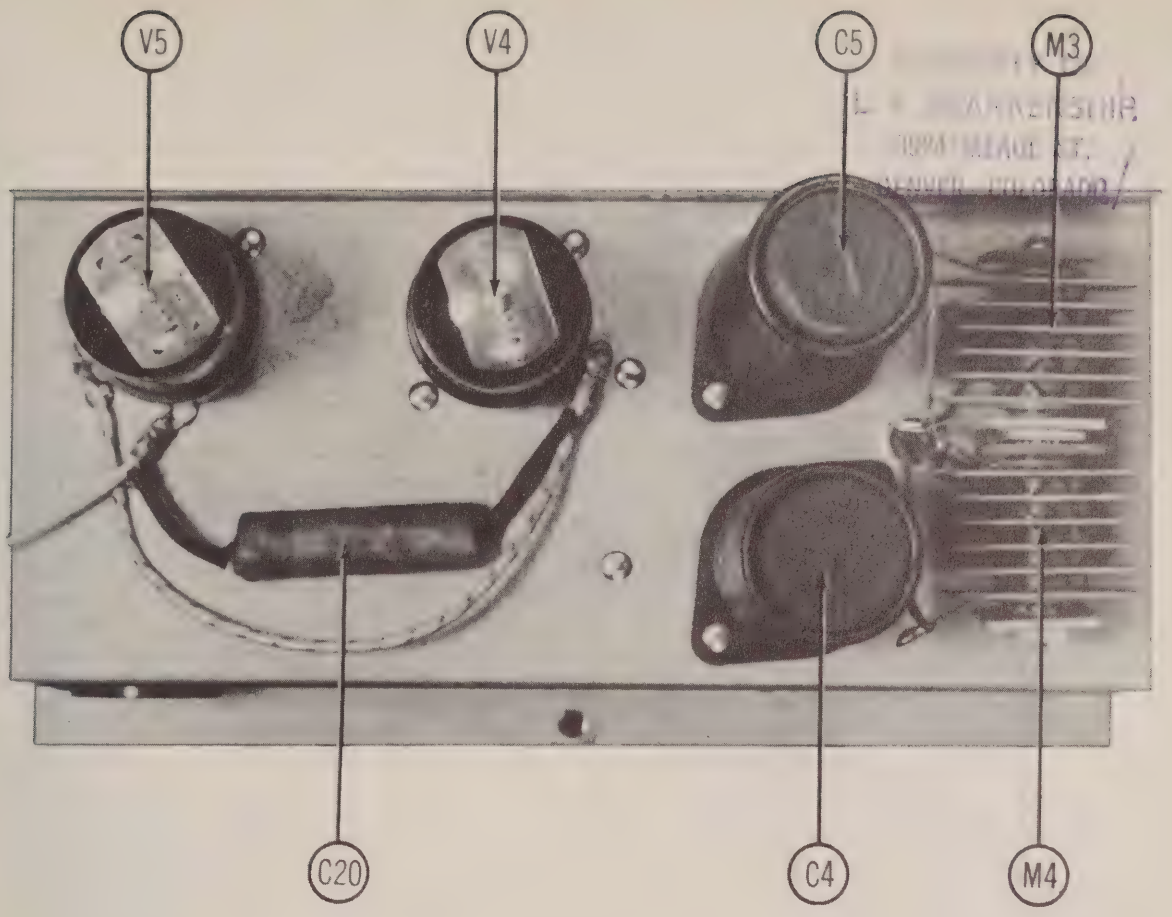


Figure 7

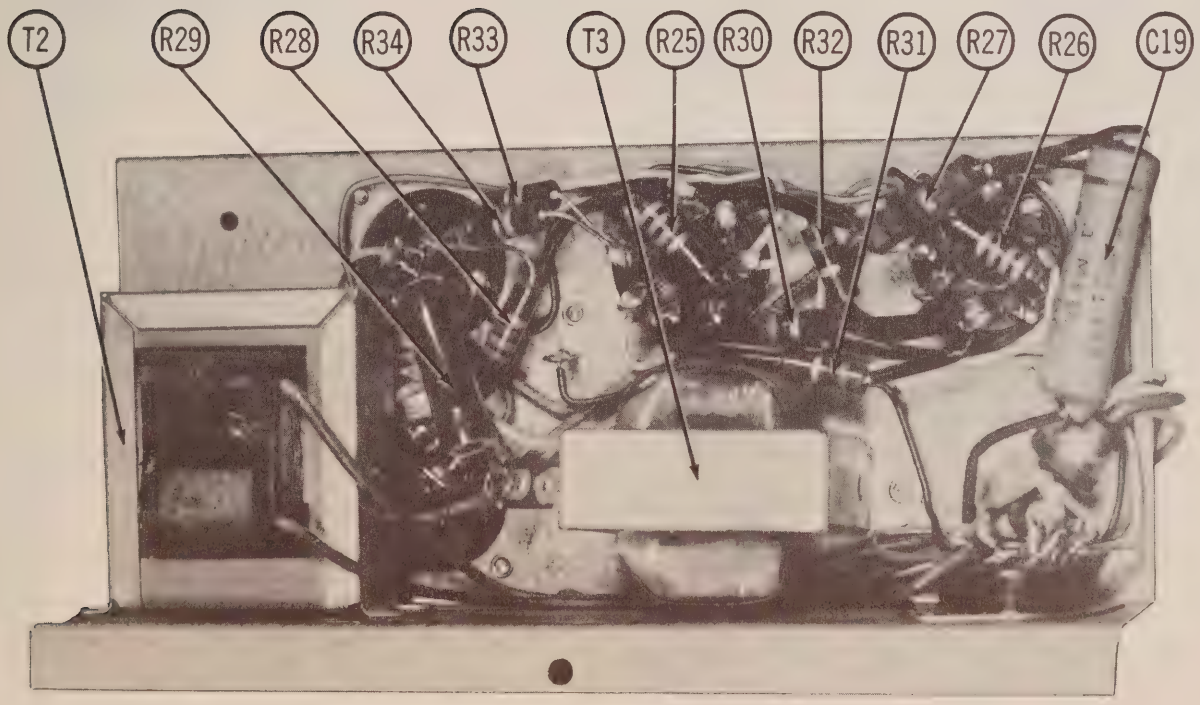
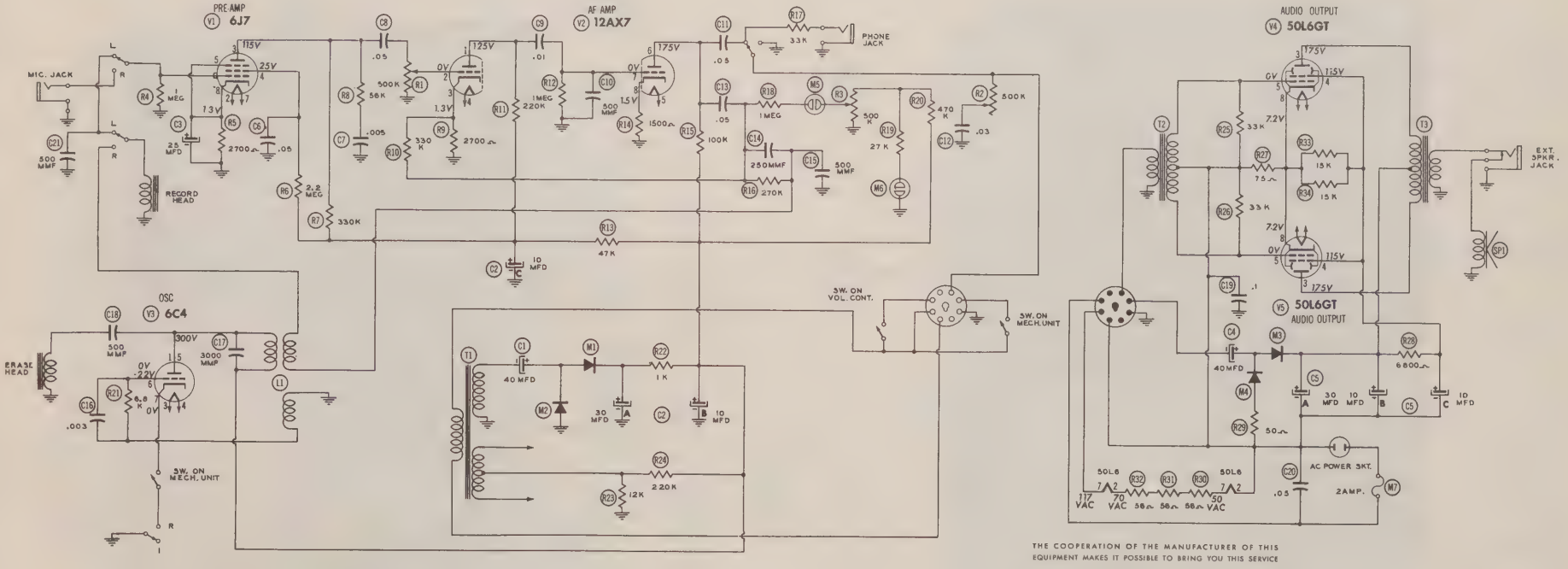


Figure 8



THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	TOP CAP
V 1	6J7	0Ω	♦. 6Ω	† 380KΩ	† 2. 2Meg	2. 7KΩ	INF	♦. 6Ω	2. 7KΩ	170Ω ♦0Ω
V 2	12AX7	† 270KΩ	0Ω	2. 7KΩ	♦. 6Ω	♦. 6Ω	† 100KΩ	1Meg	1. 5KΩ	Pin 9 ♦. 6Ω
V 3	6C4	† 1000Ω	† 35KΩ	♦. 6Ω	♦. 6Ω	† 1000Ω	6. 8KΩ	♦0Ω		
V 4	50L6GT	0Ω	▲120Ω	¶500Ω	¶6. 1KΩ	▲1. 5KΩ	▲100Ω	▲100Ω	▲75Ω	
V 5	50L6GT	▲0Ω	▲0Ω	¶500Ω	¶6. 1KΩ	▲1. 5KΩ	▲100Ω	▲70Ω	▲75Ω	

▲ SWITCH IN "RECORD" POSITION
† MEASURED FROM OUTPUT OF M1
¶ MEASURED FROM OUTPUT OF M3
♦ MEASURED FROM JUNCTION OF R23 AND R24
▲ MEASURED FROM JUNCTION OF R28 AND C5

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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MECHANICAL PARTS LIST

Ref. No.	Description
1	Control Knob
2	Rear Plate Mounting Screw
3	Rear Plate
4	Plate Spacer
5	Fast Forward Control Knob
6	Front Plate
7	Front Plate Mounting Screw
8	Plate Spacer
9	Pressure Roller
10	Rubber Grommet
11	Spacer
12	Take-up Shaft Assembly
13	Take-up Drive Belt
14	Brake Spring
15	Detent Spring
16	Tension Idler Pulley Assembly
17	Tension Spring for Item 16
18	Take-up Brake Assembly
19	Pressure Release Lever for Fast Forward
20	Head and Pressure Roller Lever
21	Record Head
21A	Erase Head
22	Tape Guide Assembly
23	Supply Shaft Assembly
24	Roller Plate Return Spring
25	Pressure Arm Spring
26	Roller Plate Guide Screw and Bushing
27	Roller Plate
28	Detent Slide
29	Supply Reel Brake Assembly
30	Sub Mounting Plate
31	Tension Spring for Item 32
32	Rewind Pulley Hanger
33	Rewind Drive Roller Assembly
34	Rewind Drive Belt
35	Rewind Pulley
36	Detent Lever Assembly
37	Motor Transfer Lever Assembly
38	Flywheel Assembly
39	Fast Forward Control Cam and Shaft
40	Shouldered Nut
41	Brake and Head Pressure Release Lever
42	Fast Forward Pivot Lever Assembly
43	Tension Spring
44	Tension Spring for Item 45
45	Fast Forward Drive Pulley Hanger
46	Fast Forward Drive Roller
47	Fast Forward Drive Belt
48	Fast Forward Drive Pulley
49	Erase Switch
50	Motor Switch
51	Motor Stop Lug
52	Stop Lug Adjustment Screw
53	Motor Mounting Screw
54	Flat Washer
55	Spacer
56	Mounting Plate
57	Motor Swing Plate Assembly
58	Motor Drive Roller
59	Motor
60	Motor Fan

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
V1	262-6J7	6J7, Pre-amplifier
V2	262-12AX7	12AX7, AF Amplifier
V3	262-6C4	6C4, Oscillator
V4	262-50L6	50L6, Power Output
V5	262-50L6	50L6, Power Output
C1	199-2025-406	Voltage Doubler Cap., 40 mfd. @ 250 V
C2A	199-2930	Filter, 30 mfd. @ 350 V
C2B		Filter, 10 mfd. @ 350 V
C2C		Decoupling, 10 mfd. @ 350 V
C3	199-2001-256	Pre-amplifier Cathode, 25 mfd. @ 25 V
C4	199-2025-406	Voltage Doubles Cap., 40 mfd. @ 250 V
C5A	199-2930	Filter, 30 mfd. @ 350 V
C5B		Filter, 10 mfd. @ 350 V
C5C		Filter, 10 mfd. @ 350 V
C6	199-4021-503	Pre-amplifier Screen, .05 mfd. @ 400 V
C7	199-4030-502	Tone Compensation, .005 mfd. @ 600 V
C8	199-4021-503	Audio Coupling, .05 mfd. @ 400 V
C9	199-4020-103	Audio Coupling, .01 mfd. @ 400 V
C10	199-3001-501	2nd AF Amplifier Grid, 500 mmf. @ 500 V
C11	199-4021-503	Audio Coupling, .05 mfd. @ 400 V
C12	199-4021-303	Tone Compensation, .03 mfd. @ 400 V
C13	199-4021-503	Audio Coupling, .05 mfd. @ 400 V
C14	199-3001-251	Tone Compensation, 250 mmf. @ 500 V
C15	199-3001-501	Voltage Divider, 500 mmf. @ 500 V
C16	199-4030-302	Oscillator Grid Cap., .003 mfd. @ 600 V
C17	199-3023-302	Fixed Trimmer, 3000 mmf. @ 500 V
C18	199-3001-501	Oscillator Coupling, 500 mmf. @ 500 V
C19	199-4011-104	Bias Filter, .1 mfd. @ 200 V
C20	199-4021-503	Line Filter, .05 mfd. @ 400 V
C21		Tone Comp. 500 mmf. @ 500V
R1	601-41	Volume Control 500KΩ 1/2 W
R2	601-40	Tone Control, 500KΩ, 1/2 W
R3	601-40	Level Indicator Control, 500KΩ, 1/2 W

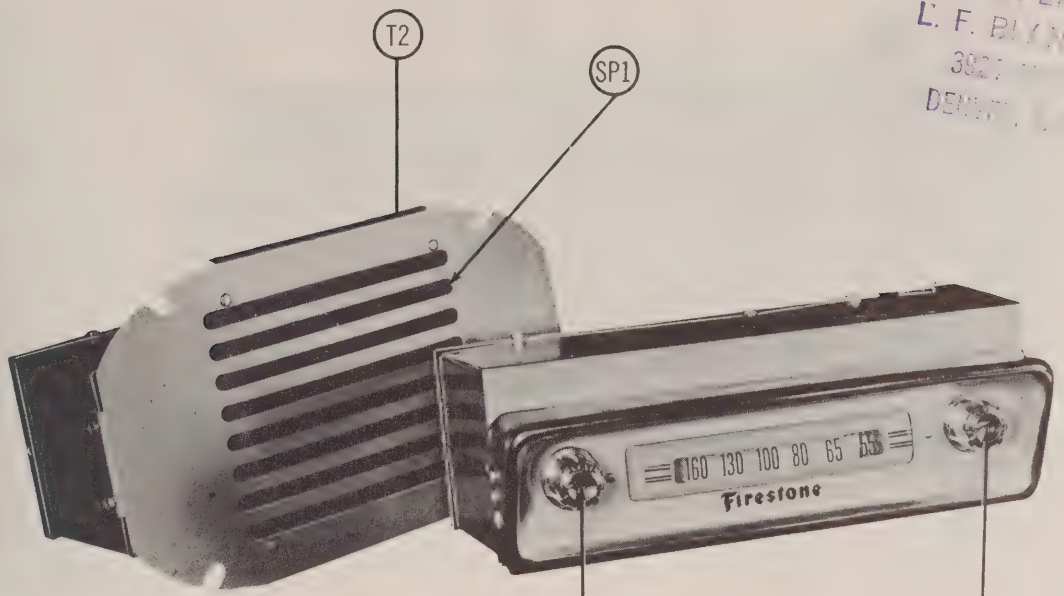
ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
R4	600-0116-105	Pre-amplifier Grid, 1 meg. 1/2 W
R5	600-0116-272	Pre-amplifier Cathode, 2700Ω, 1/2 W
R6	600-0116-225	Pre-amplifier Screen, 2.2 meg., 1 W
R7	600-0116-334	Pre-amplifier Plate, 330KΩ, 1 W
R8	600-0116-563	Tone Compensation, 56KΩ, 1 W
R9	600-0116-272	AF Amplifier Cathode, 2700Ω, 1/2 W
R10	600-0116-334	Voltage Divider, 330KΩ, 1 W
R11	600-0116-224	AF Amplifier Plate, 220KΩ 1/2 W
R12	600-0116-105	AF Amplifier Grid, 1 meg., 1/2 W
R13	600-0116-473	Decoupling, 47KΩ, 1 W
R14	600-0116-152	AF Amplifier Cathode, 1500Ω, 1/2 W
R15	600-0116-104	AF Amplifier Plate, 100KΩ, 1/2 W
R16	600-0116-274	Tone Compensation, 270KΩ, 1/2 W
R17	600-0116-333	Tone Compensation, 33KΩ, 1/2 W
R18	600-0116-105	Series Neon, 1 meg., 1/2 W
R19	600-0116-273	Series Neon, 27KΩ, 1/2 W
R20	600-0116-474	Voltage Divider, 470KΩ, 1 W
R21	600-0116-682	Oscillator Grid, 6.8KΩ, 1/2 W
R22	600-0116-102	Filter, 1000Ω, 1 W
R23	600-0116-123	Voltage Divider, 12KΩ, 1 W
R24	600-0116-224	Voltage Divider, 220KΩ, 1/2 W
R25	600-0116-333	Driver Transformer Shunt, 33KΩ, 1/2 W
R26	600-0116-333	Driver Transformer Shunt, 33KΩ, 1/2 W
R27	600-0116-750	Output Cathode, 75Ω, 1 W
R28	600-0116-682	Filter, 6800Ω, 2 W
R29	600-1008-500	Surge Limiter, Wire Wound, 50Ω, 5 W
R30	600-0116-560	Filament Dropping, 56Ω, 1 W
R31	600-0116-560	Filament Dropping, 56Ω, 1 W
R32	600-0116-560	Filament Dropping, 56Ω, 1 W
R33		Output Screen, 15KΩ, 1 W
R34		Output Screen, 15KΩ, 1 W
T1	710-4064	Power Transformer
T2	710-1010	Driver Transformer
T3	710-2041	Output Transformer
SP1	S-10892	Speaker
L1	535-4	Oscillator Coil
M1	595-5	Selenium Rectifier, 65MA
M2	595-5	Selenium Rectifier, 65MA
M3	595-4	Selenium Rectifier, 150MA
M4	595-4	Selenium Rectifier, 150MA
M5	456-14	Neon Bulb, Type NE-51
M6	456-14	Neon Bulb, Type NE-51
M7	320-835-0200	Fuse, 2 Amp., Type 3AG
M8	680-78	Switch, Record - Play

FIRESTONE
MODEL 4-B-67 (Code 120-2-F152)

PROPERTY OF
L. F. BLANKENSHIP
3821
DENVER, COLO.

FIRESTONE
MODEL 4-B-67 (Code 120-2-F152)



FIRESTONE
MODEL 4-B-67 (Code 120-2-F152)

TRADE NAME	Firestone Model 4-B-67 (Code 120-2-F152) (For 1952 Ford Automobiles)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Pkwy., Akron, Ohio
TYPE SET	Battery Operated Cusom Built Automobile Superheterodyne Receiver
TUBES (Six)	Types 6BA6 RF Amp., 6BE6 Conv., 6BA6 IF Amp., 6AT6 Det.-AVC-AF Amp., 6V6GT (or) 6AQ5 Audio Output, 6X5GT (or) 6X4 Rectifier
POWER SUPPLY	6 Volt Storage Battery — RATING 5.6 Amp. @ 6.3 Volts DC
TUNING RANGE—BROADCAST	538-1600 KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Turn tuning gang fully open and set pointer 3/4 inch from right hand end of dial background plate. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 1 (grid) of 6BE6 (V2) Low side to chassis.	455KC (400∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2 A3, A4	Adjust for maximum output.
2.	100MMF	High side to antenna post. Low side to chassis.	1600 KC	"	"	A5	Adjust for maximum output. If A5 has insufficient range adjust trimmer on opposite end of stator plates.
3.	"	"	1400 KC	Tune in 1400 KC signal	"	A6, A7	"
4.	"	"	600 KC	Tune in 600 KC signal	"	A8, A9	"
	Repeat Step 3						

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amplifier	6BA6	6BA6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amplifier	6BA6	6BA6	7BK	
V4	Det-AVC-AF Amp.	6AT6	6AT6	7BT	
V5A	Audio Output	6V6GT	6V6GT	7AC	
B	Audio Output	6AQ5	6AQ5	7BZ	
V6A	Rectifier	6X5WGT	6X5WGT	6S	
B	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: Firestone PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	■20	350	C E-86	AFH3-107		UP2235C		FP345.8	TVL-3678	
B	▲20	350								
C	20	25								
C2	.05	200	C207	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	.05	200	C207	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C4	.05	200	C207	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C5	100		CC200	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C6	220			SI220	D6-221	5W5T25	GP2K-221	UC-5322	5GA-T22	Note 1
C7	.01	600	C206	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	Note 2
C8	220			SI220	D6-221	5W5T25	GP2K-221	UC-5322	5GA-T22	Note 1
C9	.01	600	C206	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C10	.01	600	C206	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C11	.008	1600	C205	P1688-008		PTE16D8		PT1628	MB-D8	
C12	.5	100	C209	P185-5		MP2P5			68P20	
C13	.5	100	C209	P185-5		MP2P5			68P20	

Note 1. Some models use a 200MMF in this application. (Part No. CC201).
Note 2. Some models use a .002 MFD in this application (Part No. C203).

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: FIRESTONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	750KΩ	½	RV-100	Q13-137			U-51	Volume
B	Switch		Not Req.	S-4 *			EB-158 *	Attach to R1A
C	Switch		Not Req.	76-1			US-26	Attach to R1A

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: FIRESTONE PART No.	IRC PART No.	NOTES
R2	1.2Meg	½		BTS-1.2 Meg	Note 1
R3	330Ω	½	R303	BTS-330	
R4	20KΩ	½	R306		
R5	1800Ω	½		BTS-1800	Note 2
R6	2 Meg	½	R310		
R7	20KΩ	2	R313		
R8	10 Meg	½	R311	BTS-10 Meg	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: PART No.	IRC PART No.	NOTES
R9	250KΩ	½	R307		
R10	500KΩ	½	R308		
R11	330Ω	½	R303	BTS-330	
R12	1000Ω	1	R312	BTA-1000	
R13	100Ω	½	R301	BTS-100	
R14	100Ω	½	R301	BTS-100	

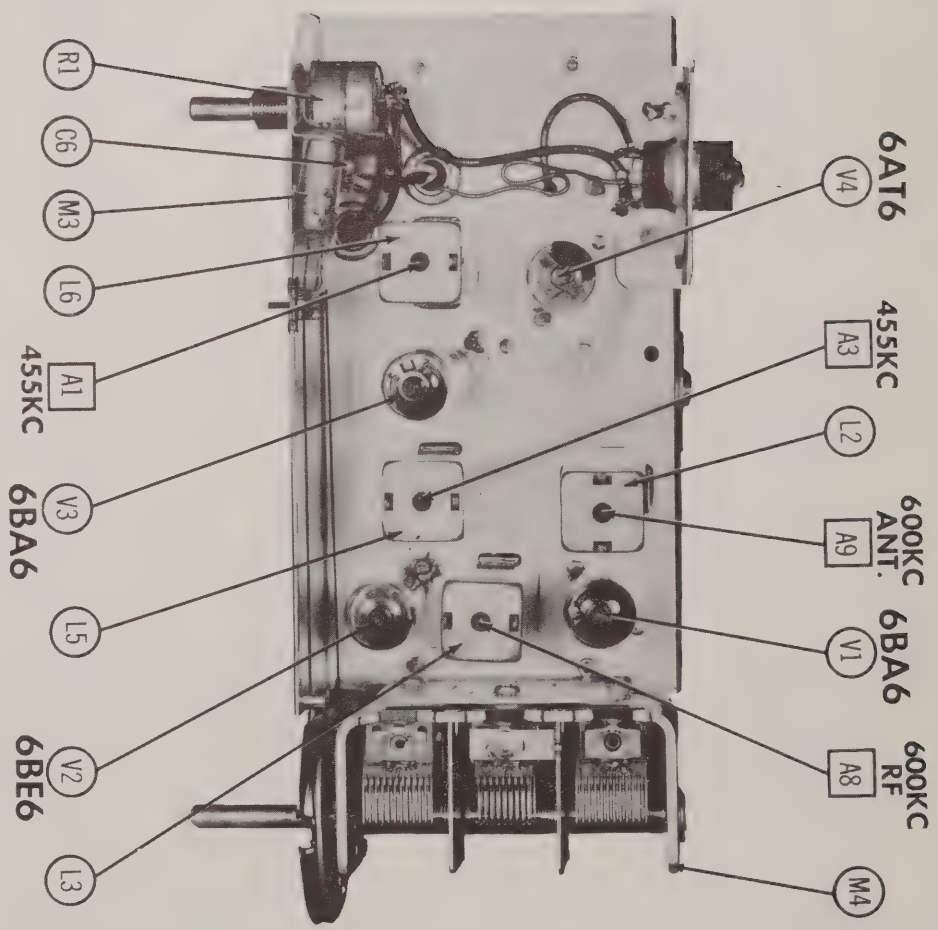
Note 1. Some models use a 1 Meg resistor in this application.
Note 2. Some models use a 1500Ω resistor in this application.

TRANSFORMER (VIBRATOR)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA: FIRESTONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	6.3V ② 2A	430VCT .046ADC			TV-100		P-2971	VT-1 ①	V-16K

① Drill one new mtg. hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		FIRESTONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T2	2.4KΩ	3.3Ω	160Ω	.43Ω	Part of Spkr.	A-3876	A-2928	RO-2	S-1X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	FIRESTONE PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω	PM-251	ST-115 Mod. P4-X	4A07	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	FIRESTONE PART No.	MERIT PART No.	
L1	Noise Elimina-tor	1.4Ω		L200		Wound on 10MMF capacitor
L2	Ant. Coil	14Ω	5Ω	15053 *		* Alternate part # 57FB-3.
L3	RF Coil	100Ω	6.5Ω	15054 †		† Alternate part # 57FB-4
L4	Osc. Coil	9Ω		L201		Tap @ 8Ω
L5	Input IF	19Ω	19Ω	14977■	BC-352	■ Alternate part. #1655-16
L6	Output IF	19Ω	19Ω	14977■	BC-353	
L7	Line Choke	0Ω		L203		
L8	Hash Choke	0Ω		L202		

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FRE-QUENCY	REPLACEMENT DATA				NOTES
				FIRESTONE PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	6.3V	115Ω	V-83	5301	859	5301	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			FIRESTONE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	14A	A201		307014	157014	SFE-14	HDI

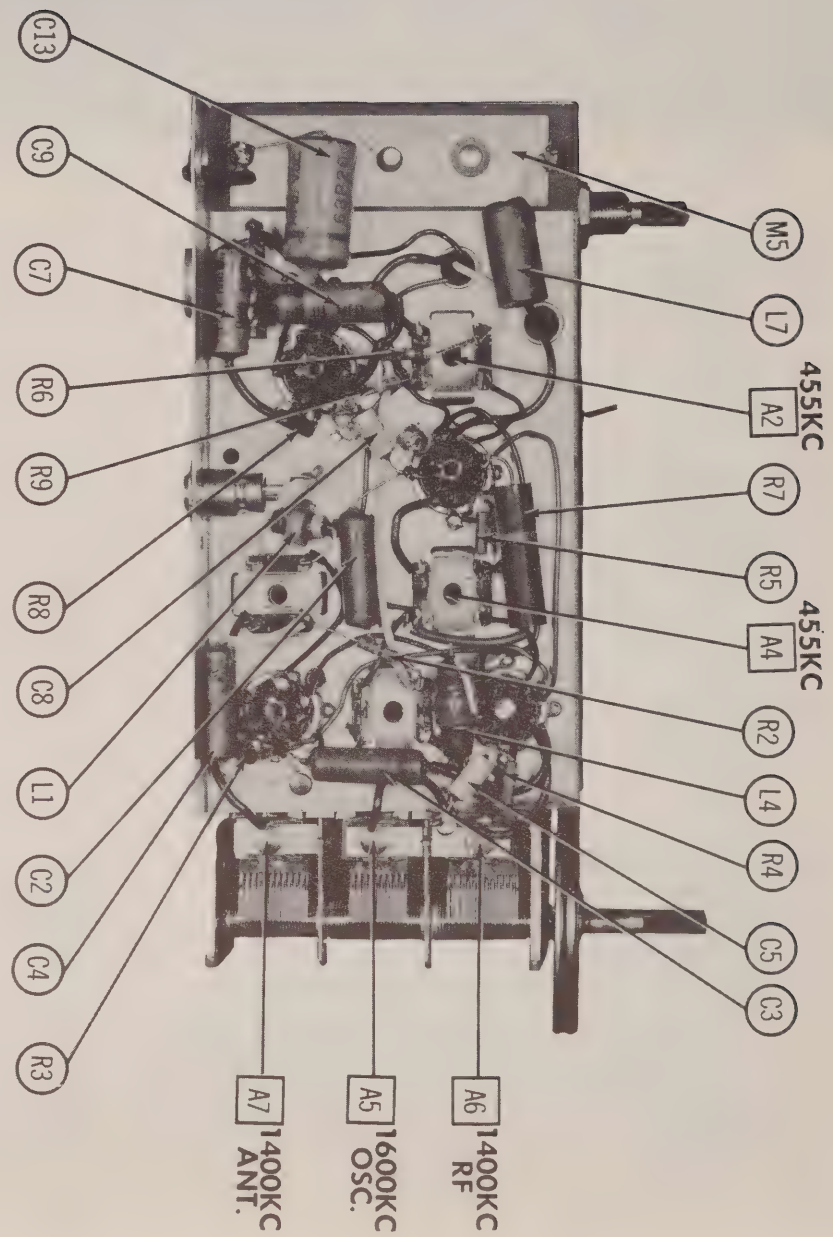
DIAL LIGHTS

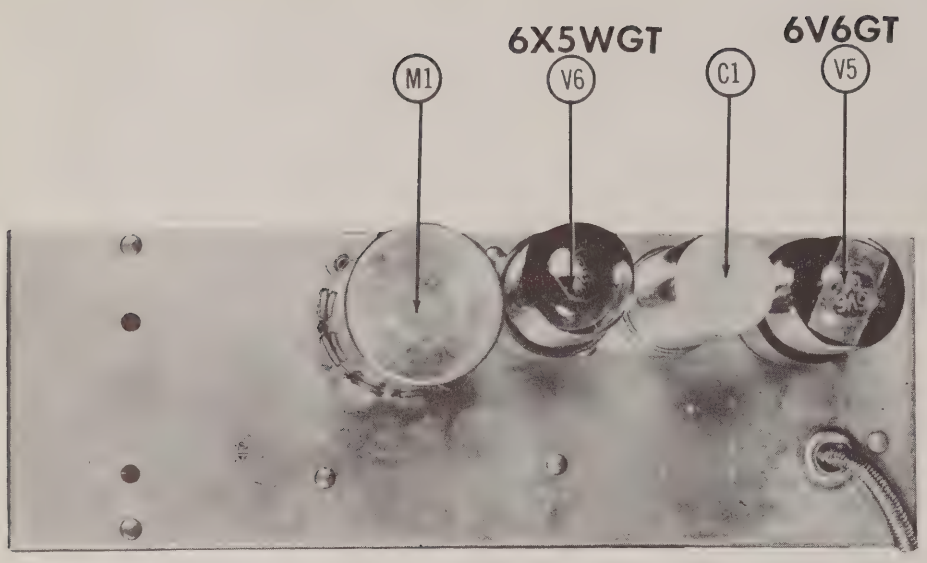
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					FIRESTONE PART No.		
M3	Bayonet	6-8V	.15A	Brown	TS-47		Type No. 47

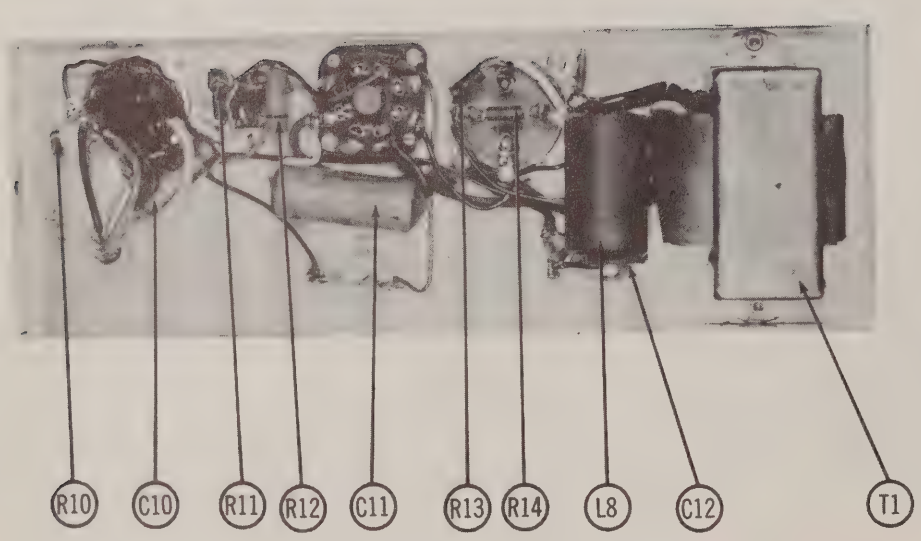
MISCELLANEOUS

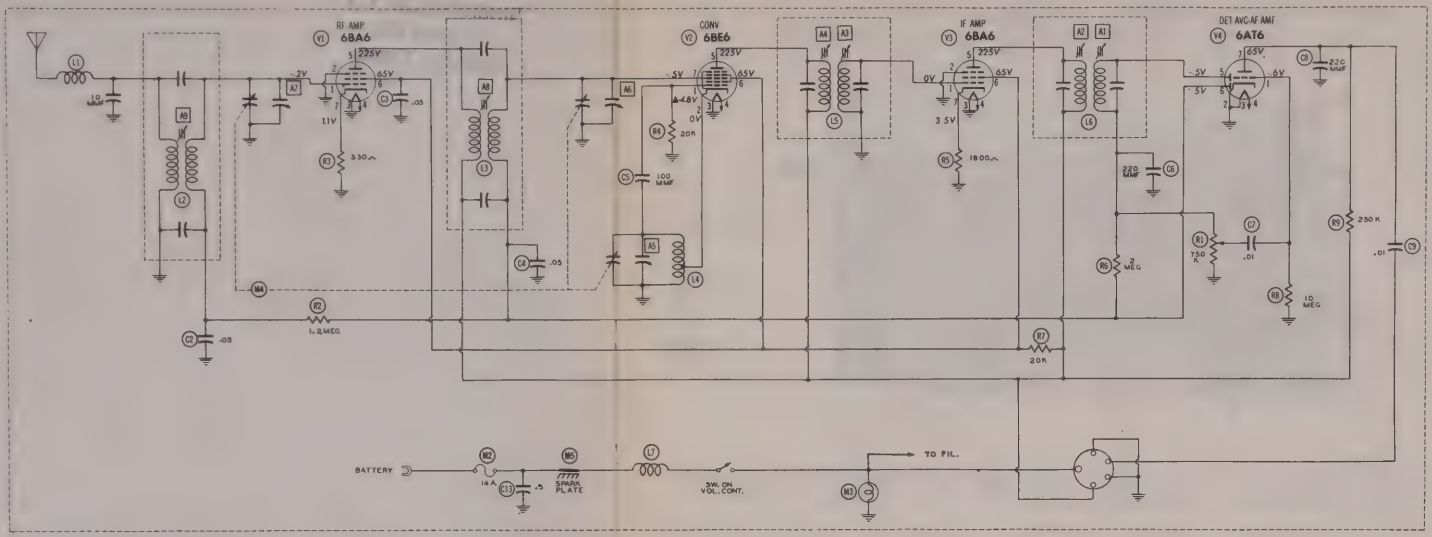
ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M4	3 Gang Var. Cap.	CV-100A	(23-391MMF, 24-387MMF, 35-198MMF)
M5	Spark Plate		
	Dial Scale	D-152	
	Dial Pointer	PS152	
	Knob	H155	

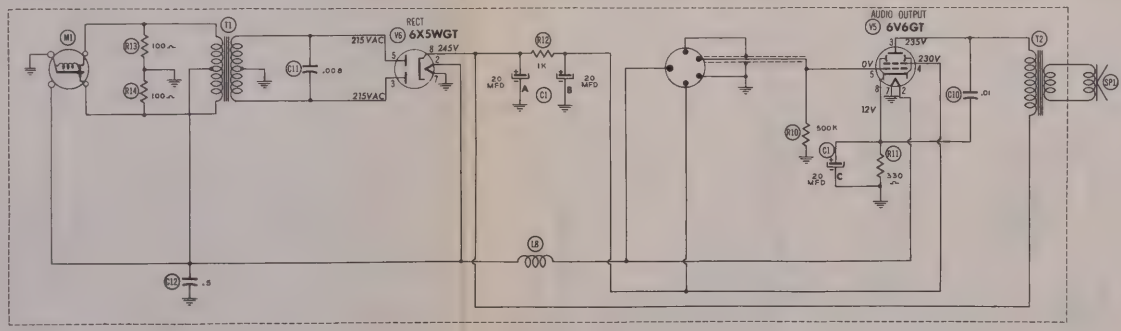
CHASSIS—BOTTOM VIEW




6X5WGT
6V6GT
M1
V6
C1
V5


R10
C10
R11
R12
C11
R13
R14
L8
C12
T1





IF = 455 KC

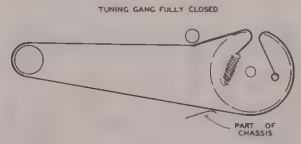
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1 - DC Voltage measurements are at 20,000 ohms per volt, AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.3 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6BA6	3.9Meg	0Ω	0Ω	.4Ω	1KΩ	†2KΩ	330Ω	
V 2	6BE6	33KΩ	1Ω	0Ω	.4Ω	1KΩ	†2KΩ	3.3Meg	
V 3	6BA6	1MΩ	0Ω	0Ω	.4Ω	1KΩ	†2KΩ	1.8KΩ	
V 4	6AT6	10Meg	0Ω	0Ω	.4Ω	750KΩ	2.7Meg	†270KΩ	
V 5	6V6GT	INF	.4Ω	†180Ω	1KΩ	500KΩ	INF	0Ω	330Ω
V 6	6X5GT	INF	.4Ω	250Ω	INF	280Ω	INF	0Ω	45KΩ

† MEASURED FROM PIN 8 OF V6
* TAKEN WITH VACUUM TUBE VOLTMETER



DIAL CORD DRIVE

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JEWEL MODELS 17C9, 17T9, 17TW7, 21C9, 21T9

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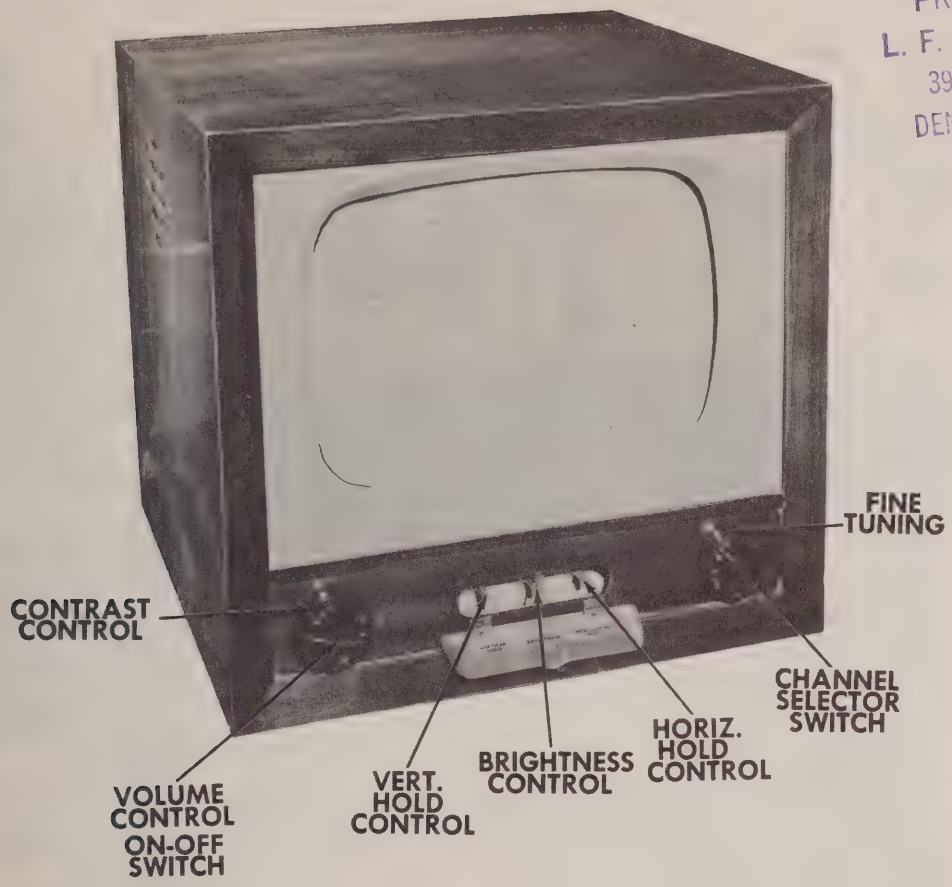

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JEWEL 17TW7

TRADE NAME Jewel Models 17C9, 17T9, 17TW7, 21C9 21T9
MANUFACTURER Jewel Radio Corporation, 900 Passaic Avenue, East Newark, New Jersey
TYPE SET Television Receiver
TUBES Twenty-one

POWER SUPPLY 110-120 Volts AC-60 Cycle
RATING 1.5 Amp. @ 117 Volts AC
TUNING RANGE Channels 2 thru 13

INDEX

Alignment Instructions 6, 7
Disassembly Instructions 15
Horizontal Sweep Circuit Adjustments 15
Parts List and Descriptions 12, 13
Photographs
Cabinet-Rear View 15
Capacitor and Alignment Identification 4, 9
Chassis -Top View 3
Photographs (Con't)
RF Tuner 10
Resistor and Inductor Identification 11, 14
Resistance Measurements 8
Schematic 2
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

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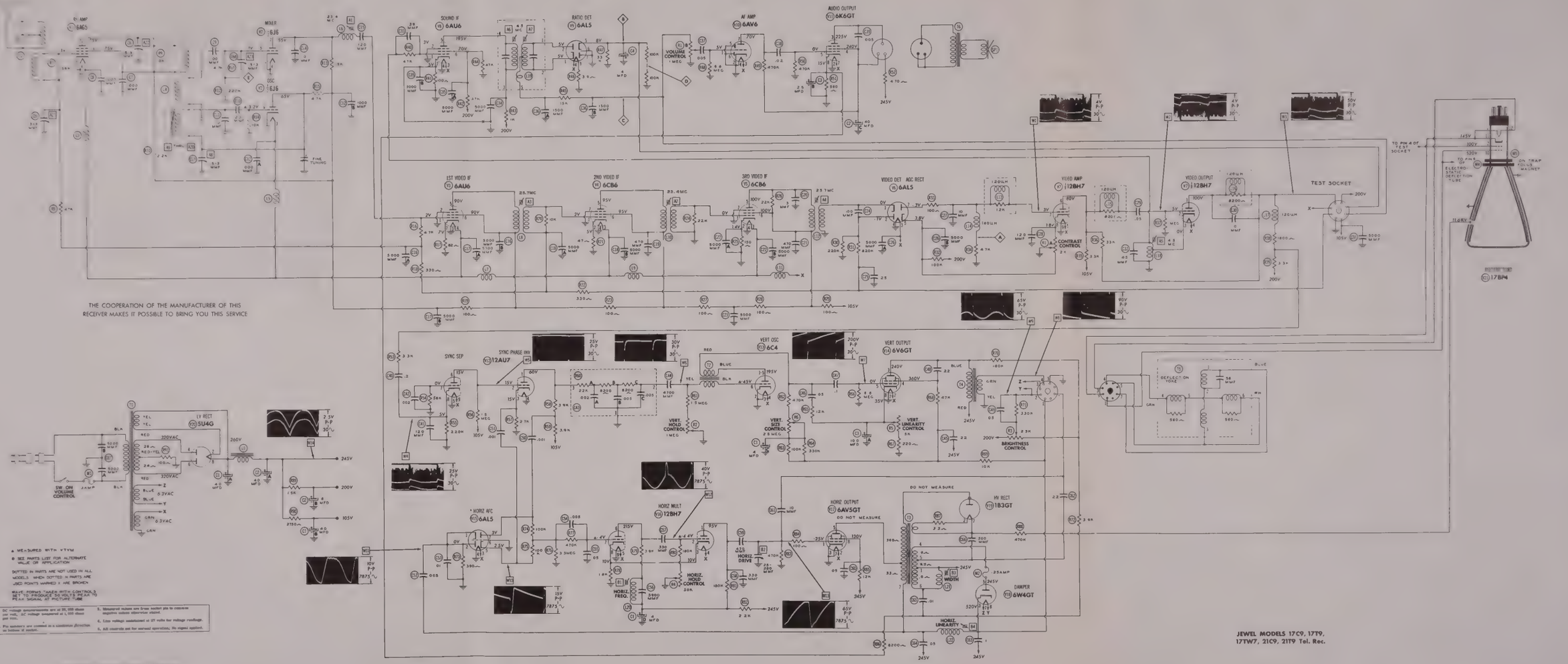
DATE 12-52 SET 187 FOLDER 7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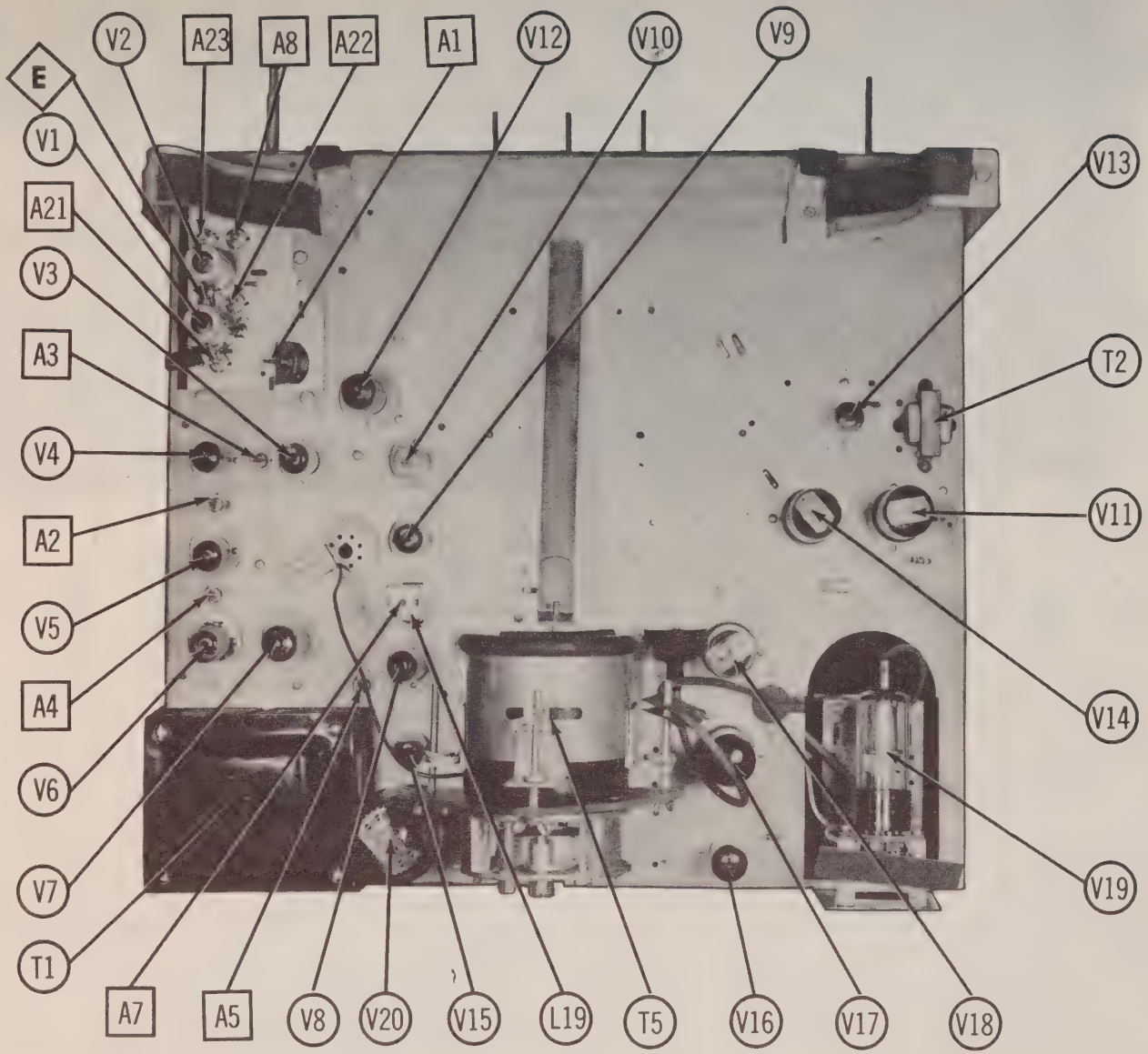

CHASSIS TOP VIEW

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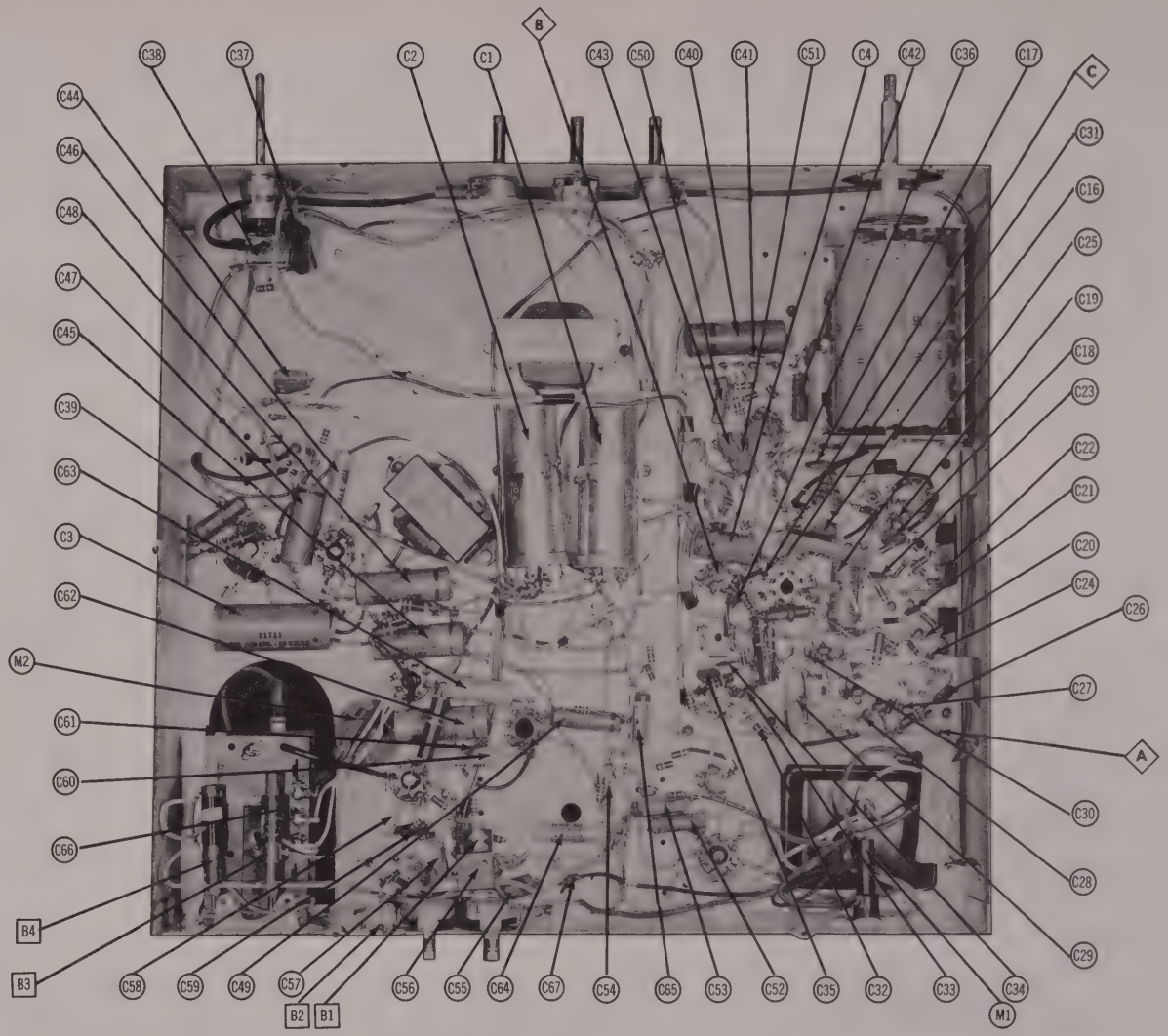
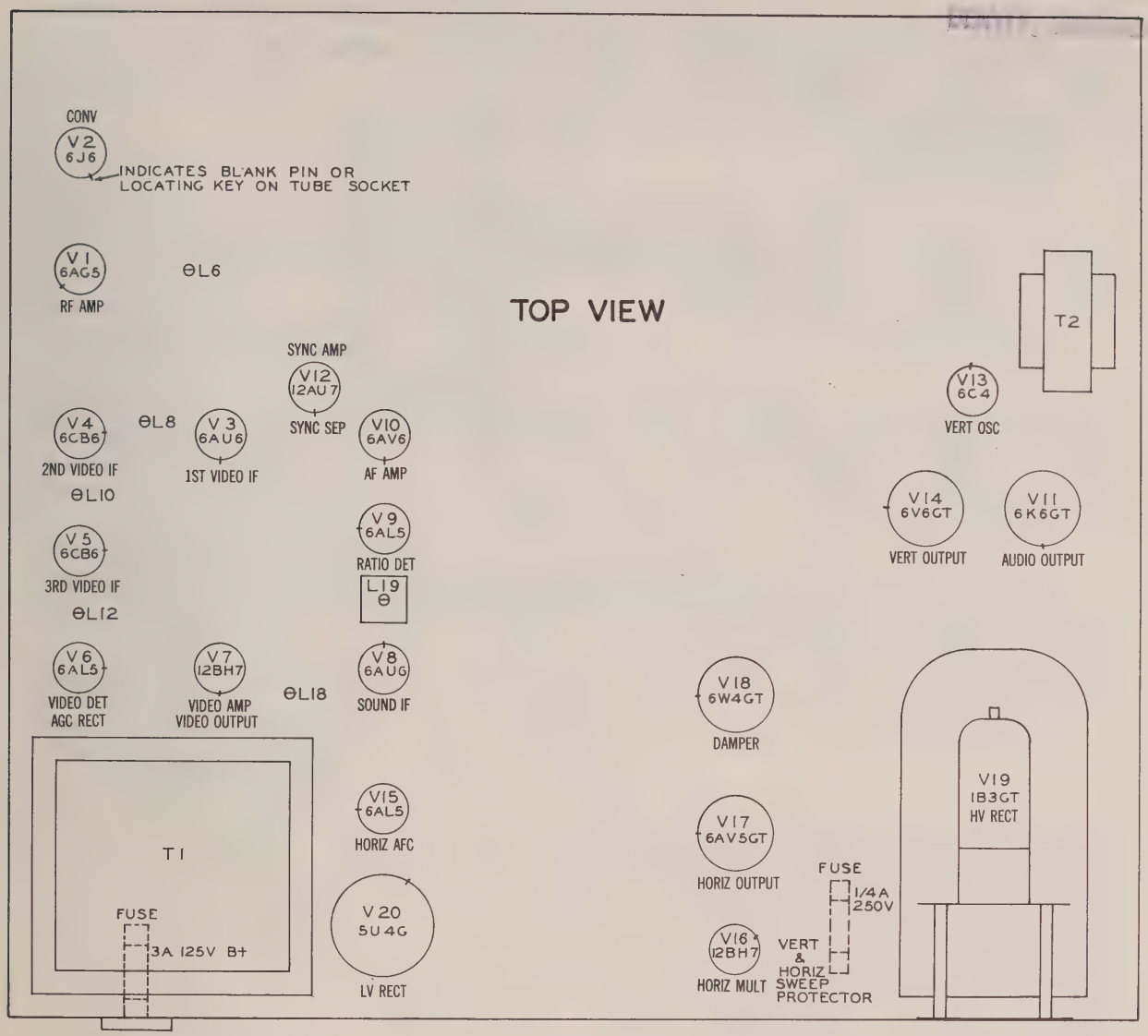


CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptons. Refer to tube placement chart for location and type of tube.

POWER SUPPLY
No raster, no sound-V20 Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5, V6, V7
No pic, no sound, has snow-V1, V2, V3
No pic, has sound, has raster-V7, V21
Has pic, no sound-V8, V9, V10, V11
Overloaded picture-V6

SYNC FAILURE
No vert. sync.-V12, V13
No horiz. sync.-V12, V15. V16
No vert. or horiz. sync.-V12

SWEEP FAILURE
No raster, has sound-V16, V17, V19, V21 Fuse (M2)
No vertical deflection-V14
Poor vert. linearity or foldover-V13, V14
Poor horiz. linearity or foldover-V16, V17, V18
Narrow picture-V16, V17, V18, V19, V20
Vert off freq.-V12, V13
Horiz. off freq.-V12, V15, V16

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal multivibrator tube to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to the AGC line (pin 3 of the Video Test Socket). Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	23.4MC (Unmod.)	Any	DC probe to point ◇A◇. Common to chassis.	A1, A2	Adjust for maximum deflection.
2.	"	"	25.7MC	"	"	A3, A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10Mc Swp)	21.9MC 26.4MC	Any	Vert. amp. to point ◇A◇. Low side to chassis.		Check for response curve similar to Fig. 1. If necessary, retouch A1 through A4 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistor s in series from point ◇B◇ to chassis. The junction of these two resistors is alignment point ◇D◇ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	.001MFD	High side to point ◇A◇. Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point ◇B◇. Common to chassis.	A5, A6	Adjust for maximum deflection.
5.	"	"	"	"	DC probe to point ◇C◇. Common to point ◇D◇.	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450 KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.001MFD	High side to point ◇A◇. Low side to chassis.	4.5MC (450KC Swp.)	4.5MC	Any	Vert. amp. to point ◇B◇. Low side to chassis.	A5, A6	Disconnect stabilizer capacitor C4. Adjust for curve of maximum aplitude and symmetry as in Fig. 2.
5	"	"	"	"	"	Vert amp. to point ◇C◇. Low side to chassis.	A7	Reconnect capacitor C4. Adjust so that 4.5MC occurs at center of cross-over lines as in Fig. 3. SLIGHTLY retouch A6 for maximum amplitude and straightness of cross-over lines.

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A8. It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct any individual channel.
If adjustment of A8 will not bring all channels well within the range of the fine tuning control it will be necessary to adjust the channel strip adjustment for each channel that is off frequency.
The channel adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel .
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp.)	211.25MC	13	Vert. amp. to point ◇A◇. Low side to chassis.	A9	Adjust to place video marker at 50% on high frequency side of response curve as in Fig. 4.
			207MC (10MC Swp.)	205.25MC	12		A10	
			201MC - (10MC Swp.)	199.25MC	11		A11	
			195MC (10MC Swp.)	193.25MC	10		A12	
			189MC (10MC Swp.)	187.25MC	9		A13	
			183MC (10MC Swp.)	181.25MC	8		A14	
			177MC (10MC Swp.)	175.25MC	7		A15	
			85MC (10MC Swp.)	83.25MC	6		A16	
			79MC (10MC Swp.)	77.25MC	5		A17	
			69MC (10MC Swp.)	67.25MC	4		A18	
			63MC (10MC Swp.)	61.25MC	3		A19	
			57MC (10MC Swp.)	55.25MC	2		A20	

ALIGNMENT INSTRUCTIONS (CONT.)

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its charactristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp.)	205.25MC 209.75MC	12	Vert. amp. through 10KΩ to point (E). Low side to chassis.	A21, A22 A23	Adjust for response similar to Fig. 5.
8.	"	"	213MC (10MC Swp.)	211.25MC 215.75MC	13	"		Check for response as in Fig. 5. If markers fall below 70% on any channel make compromise adjustments of A21, A22 and A23 with channel switch set to that channel; then recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp.)	199.25MC 203.75MC	11			
			195MC (10MC Swp.)	193.25MC 197.75MC	10			
			189MC (10MC Swp.)	187.25MC 191.75MC	9			
			183MC (10MC Swp.)	181.25MC 185.75MC	8			
			177MC (10MC Swp.)	175.25MC 179.75MC	7			
			85MC (10MC Swp.)	83.25MC 87.75MC	6			
			79MC (10MC Swp.)	77.25MC 81.75MC	5			
			69MC (10MC Swp.)	67.25MC 71.75MC	4			
			63MC (10MC Swp.)	61.25MC 65.75MC	3			
			57MC (10MC Swp.)	55.25MC 59.75MC	2			

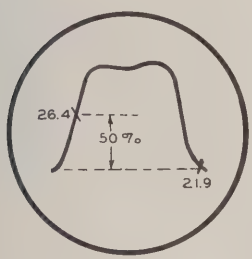


FIG. 1

FIG. 2

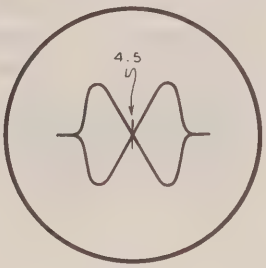


FIG. 3

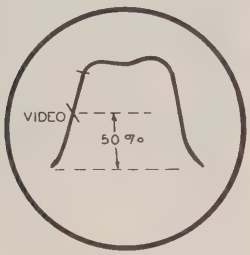


FIG. 4

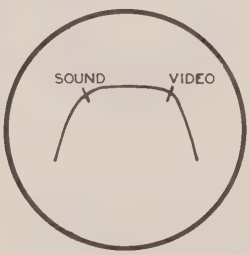
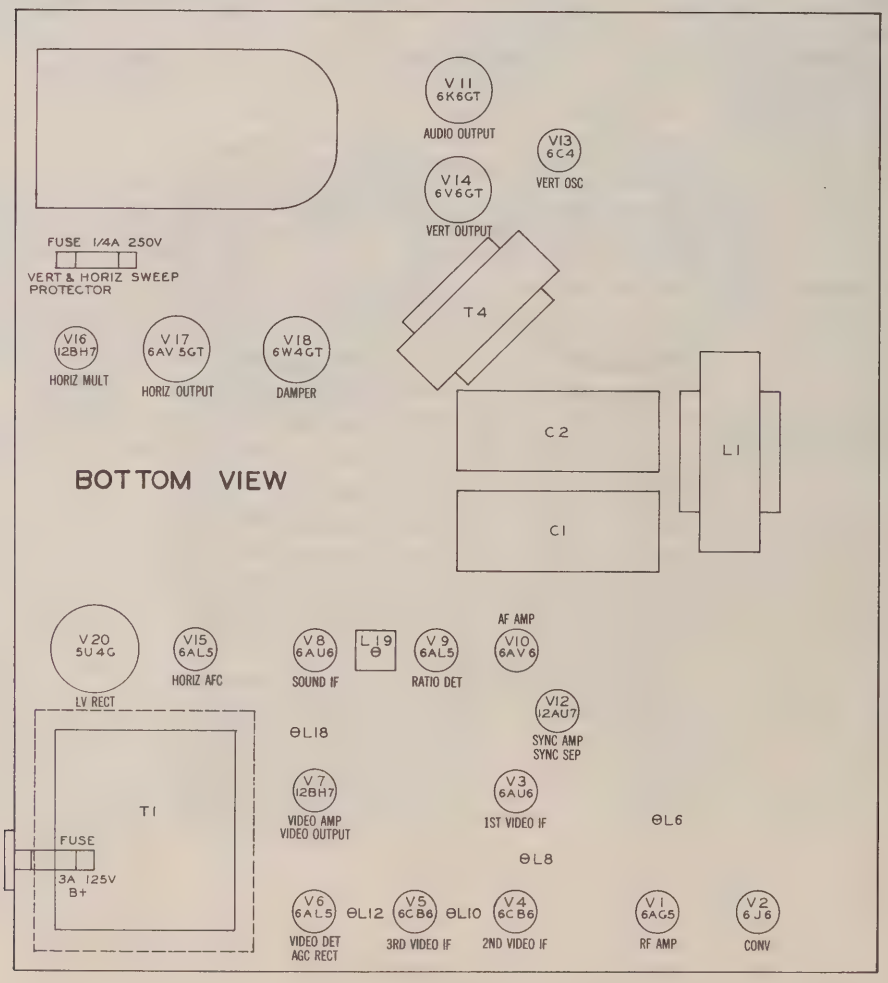


FIG. 5

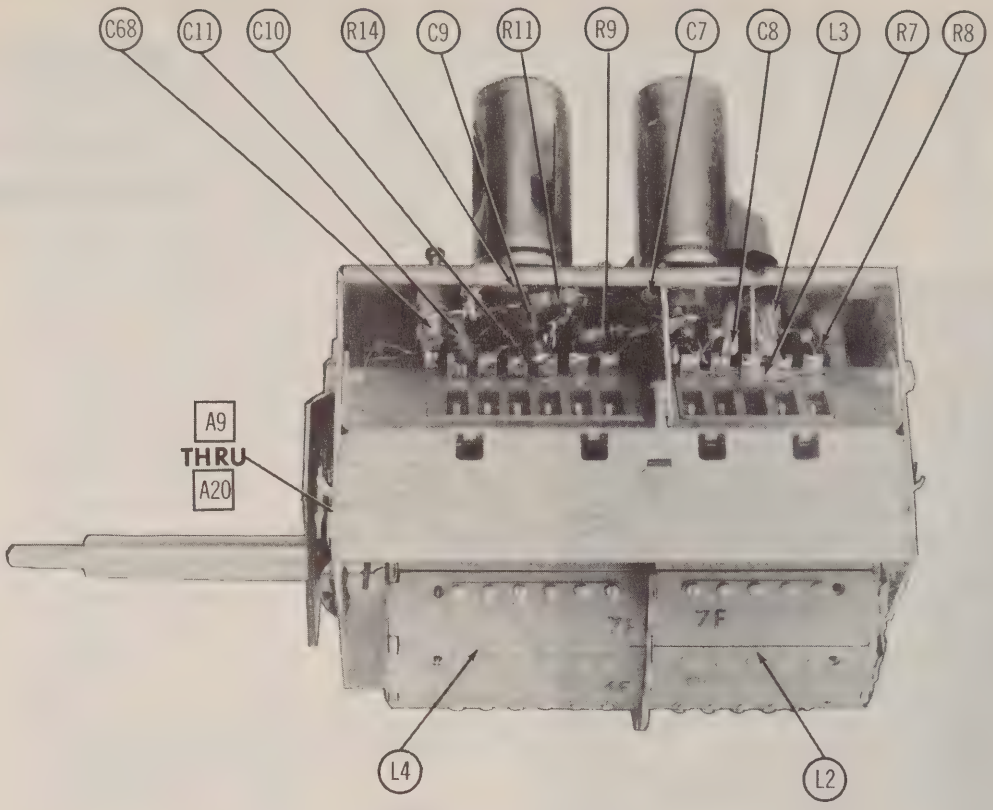
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	1.1Meg	0Ω	.1Ω	0Ω	†5.3KΩ	†5.3KΩ	0Ω		
V 2	6J6	†7KΩ	†18KΩ	.1Ω	0Ω	220KΩ	10KΩ	0Ω		
V 3	6AU6	1 Meg	0Ω	0Ω	.1Ω	†3KΩ	†3KΩ	82Ω		
V 4	6CB6	1 Meg	47Ω	.1Ω	0Ω	†2.9KΩ	†2.9KΩ	0Ω		
V 5	6CB6	.6Ω	150Ω	.1Ω	0Ω	†2.7KΩ	†2.7KΩ	0Ω		
V 6	6AL5	.3Ω	220KΩ	.1Ω	0Ω	1.7KΩ	0Ω	4.8KΩ		
V 7	12BH7	†6.6KΩ	1 Meg	.8Ω	.1Ω	.1Ω	†5.9KΩ	4.7KΩ	300Ω	0Ω
V 8	6AU6	47KΩ	0Ω	.1Ω	0Ω	†2.6KΩ	23KΩ	100Ω		
V 9	6AL5	1 Meg	1 Meg	1.8Ω	.1Ω	33KΩ	0Ω	0Ω		
V 10	6AV6	6.8Meg	0Ω	.1Ω	0Ω	0Ω	0Ω	†470KΩ		
V 11	6K6GT	0Ω	0Ω	†1.2KΩ	†540Ω	470KΩ	†71Ω	.1Ω	560Ω	
V 12	12AU7	†10KΩ	†1.5Meg	2.7KΩ	.0Ω	0Ω	†1.5Meg	56KΩ	220KΩ	.1Ω
V 13	6C4	#1.3Meg	#1.3Meg	0Ω	.1Ω	#1.3Meg	2 Meg	0Ω		
V 14	6V6GT	2.2KΩ	.1Ω	†800Ω	#57KΩ	6.8Meg	15KΩ	0Ω	2.2KΩ	
V 15	6AL5	390Ω	390Ω	.1Ω	0Ω	3.4Meg	0Ω	3.4Meg		
V 16	12BH7	†180KΩ	200KΩ	1.8KΩ	.1Ω	.1Ω	†6.2KΩ	3.8Meg	1.8KΩ	0Ω
V 17	6AV5GT	470KΩ	.1Ω	0Ω	INF	#69Ω	INF	0Ω	†12KΩ	
V 18	6W4GT	†71Ω	INF	350KΩ	†80Ω	†89Ω	INF	■.1Ω	■0Ω	
V 19	1B3GT		PINS	1 - 8	HAVE INF	RESISTANCE				Top Cap #429Ω
V 20	5U4G	.1Ω	18KΩ	■0Ω	126Ω	INF	124Ω	■.1Ω	18KΩ	
V 21	17BP4	■0Ω	†6.6KΩ	Pin 10 #0Ω	Pin 11 †340KΩ	Pin 12 ■.1Ω				

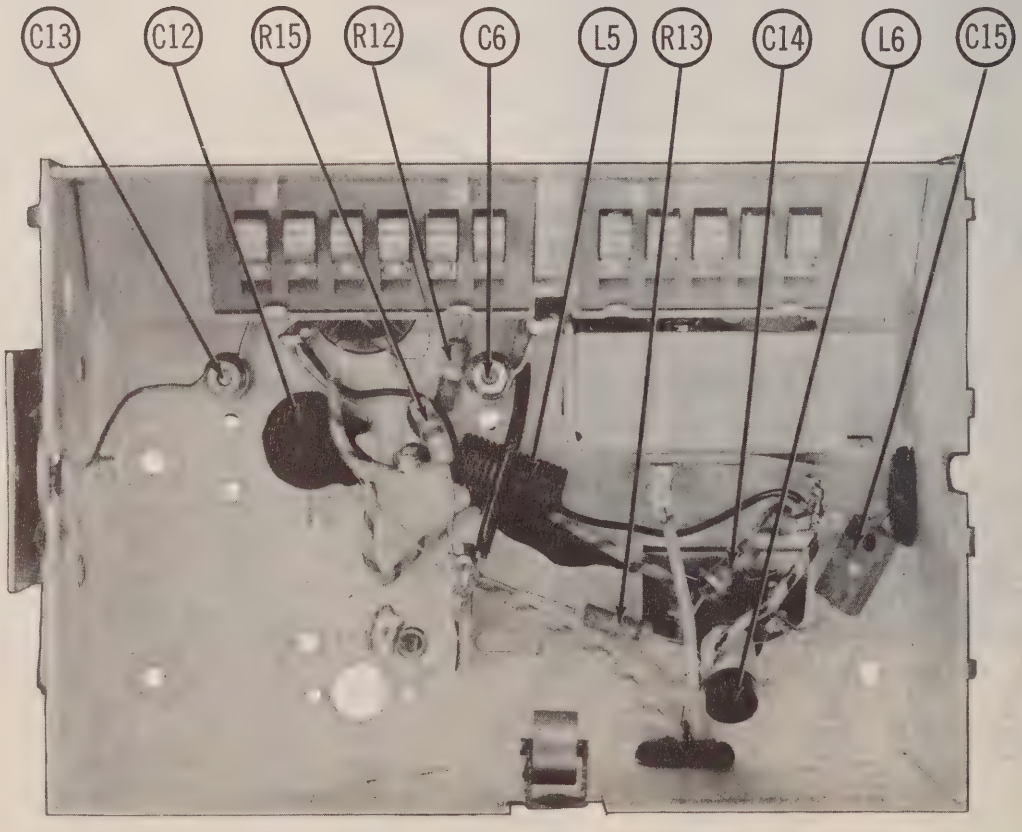
ALL CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED
† MEASURED FROM PIN 8 OF V20
# MEASURED FROM PIN 3 OF V18
■ MEASURED FROM PIN 11 OF V21



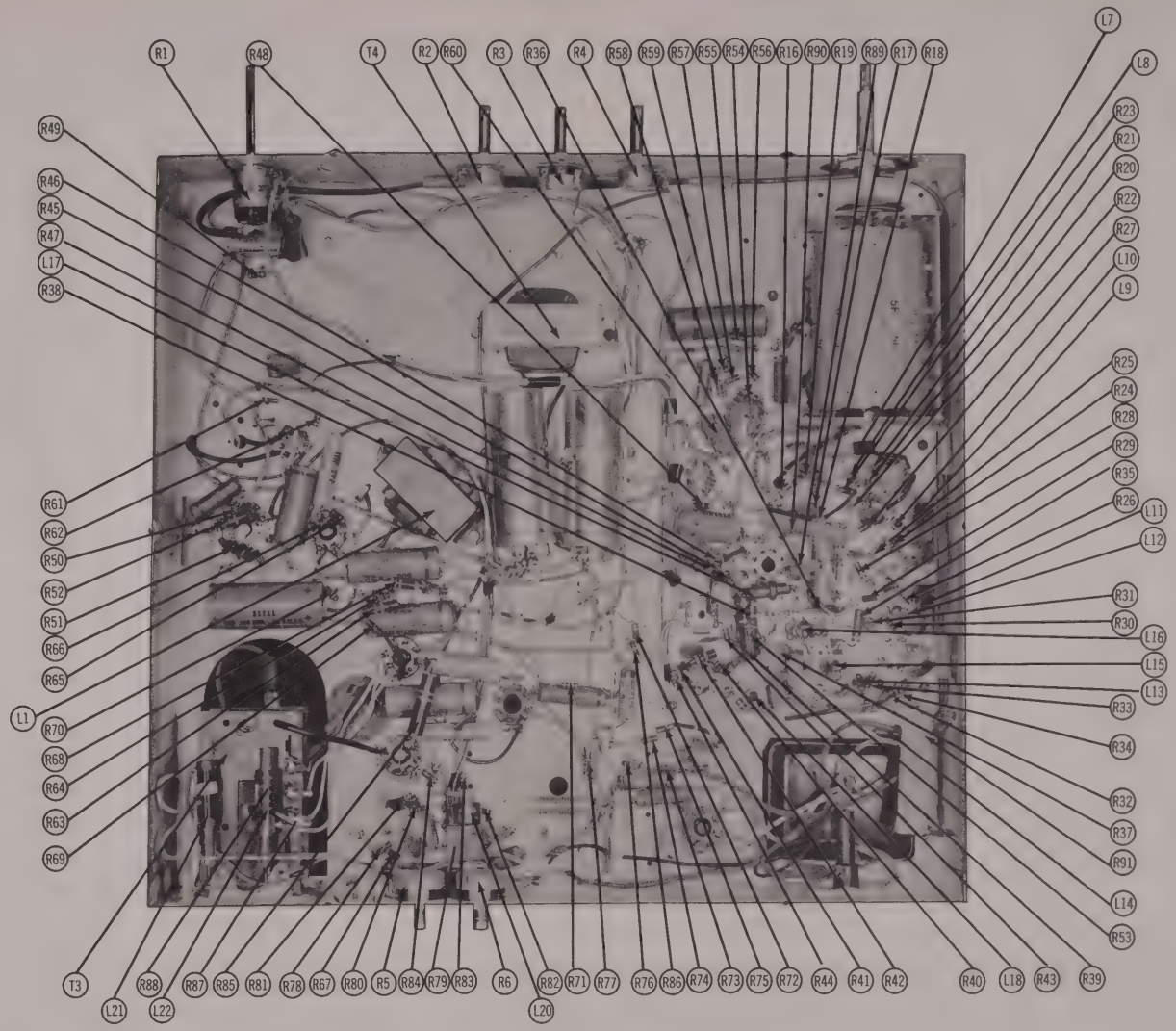
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: JEWEL PART No.	STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amplifier		6AC5	7BD	
V2	Converter		6J6	7BF	
V3	1st Video IF Amp.		6AU6	7BK	
V4	2nd Video IF Amp.		6CB6	7CM	
V5	3rd Video IF Amp.		6CB6	7CM	
V6	Video Detector AGC Rectifier		6AL5	6BT	
V7	Video Amplifier Video Output		12BH7 12BH7	9A 9A	
V8	Sound IF Amplifier		6AU6	7BK	
V9	Ratio Detector		6AL5	6BT	
V10	AF Amplifier		6AV6	7BT	
V11	Audio Output		6K6GT	7S	
V12	Sync Separator Sync Phase Inv.		12AU7	9A	
V13	Vert. Oscillator		6C4	6BG	
V14	Vert Output		6V6GT	7AC	
V15	Horizontal AFC		6AL5	6BT	
V16	Horizontal Mult		12BH7	9A	
V17	Horiz. Output		6AV5GT	6CK	
V18	Damper		6W4GT	4CG	
V19	HV Rectifier		1B3GT	3C	
V20	LV Rectifier		5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: JEWEL PART No.	SYLVANIA PART No.	RMA BASE TYPE	NOTES
V21	17BP4	17BP4 17BP4A ① 17RP4 ① 17RP4 ①	12D 12D 12C 12C	① Circuit changes necessary.

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: JEWEL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	⌀40	450		AFH3-43		UPT44145		FP376.8	TVL-3785	
B	⌀40	450		PRB450/4		BR445		TC70	TVA-1702	
C	⌀4	450								
D	4	450								
C2A	⌀40	450		AFH3-43		UPT44145		FP376.8	TVL-3785	
B	⌀8	450								
C	⌀40	450								
C3A	100	88		PRB50/100		BRH501		TC3501	TVA-1310	
B	25	50		PRB50/25		BR255A		TC36	TVA-1306	
C4	4	100		PRB150/4		BR415		TC40	TVA-1402	
C5	5-9				829-10					
C6	.5-3				829-3			CT565A		
C7	1800			SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C8	1800			SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C9	100			SII00	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C10	20			SI20NP0	TCZ-20		NP0K-200	ZT-542	5TCC-Q2	
C11	10			SI10NT50	TCN-10		NT50K-100	NT-541	5TCU-Q1	
C12A	1000	}		BPD-2X001	DD-2-102	TM5DD1	812-001	DCD-521	5HK-2D1	
B	1000									
C13	.5-3				829-3			CT565A		
C14	10			SII0NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C15	120			SII20	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C16A	5000			BPD-005	DD-2-502	TM5D5	811-005	DC-525	5HK-D5	
B	5000			BPD-005		TM5D5	811-005	DC-525	5HK-D5	
C17A	5000			BPD-005	DD-2-502	TM5D5	811-005	DC-525	5HK-D5	
B	5000			BPD-005		TM5D5	811-005	DC-525	5HK-D5	
C18A	5000			BPD-005	DD-2-502	TM5D5	811-005	DC-525	5HK-D5	
B	5000			BPD-005		TM5D5	811-005	DC-525	5HK-D5	
C19	470			SI470	D6-471		GP2K-471	UC-5347	5GA-T47	
C20	3									
C21	470			SI470	D6-471		GP2K-471	UC-5347	5GA-T47	
C22A	5000			BPD-005	DD-2-502	TM5D5	811-005	DC-525	5HK-D5	
B	5000			BPD-005		TM5D5	811-005	DC-525	5HK-D5	
C23	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C24	100			SII00	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C25	.25	200		P488-25		PJP225		PT4025	2TM-P25	
C26A	5000			BPD-005	DD-2-502	TM5D5	811-005	DC-525	5HK-D5	
B	5000			BPD-005		TM5D5	811-005	DC-525	5HK-D5	
C27	10			SII0	D6-100	5W5Q1	GP1K-100	UC-541	5GA-Q1	
C28	120			SII20	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C29	.05	600		P688-05	DF-503	PTE685		PT615	6TM-S5	
C30	10			SII0	D6-100	5W5Q1	GP1K-100	UC-541	5GA-Q1	
C31	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C32	.45									
C33	39			SI39	D6-390	5W5Q4	GP1K-390	UC-5439	5GA-Q39	
C34	5000			BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C35A	5000			BPD-005	DD-2-502	TM5D5	811-005	DC-525	5HK-D5	
B	5000			BPD-005		TM5D5	811-005	DC-525	5HK-D5	
C36A	1500	}		BPD-2X0015	DD-2-152	TM5DD15	812-0015	DCD-5215	5HK-2D15	
B	1500									
C37	.005	400		P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C38	.02	600		P688-02	DF-203	PTE682		PT612	6TM-S2	
C39	.005	600		P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C40	.2	600		684-2				TP419		
C41	120			SII20	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C42	.002	600		P688-002	D6-202	PTE6D2	GP2-333-202	PT622	6TM-D2	
C43A	.002			P688-002		PTE6D2		PT622		
B	.005			P688-005	⌀PC-100	PTE6D5	⌀1405-01	PT625	⌀10IC1	
C	.005			P688-005		PTE6D5		PT625		
C44	4700	500		1464-005		5R5T5		MCB465	MS-25	
C45	.22	600		684-25		PTE6P25		PT6025	6TM-P25	
C46	.05	600		P688-05	DF-503	PTE685		PT615	6TM-S5	
C47	.1	600		P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C48	.22	600		684-25		PTE6P25		PT6025	6TM-P25	

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: JEWEL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C49	.05	200		P288-05	DF-503	PT2S5		PT415	2TM-S5	
C50	.001	600		P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C51	.001	600		P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C52	.005	600		P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C53	.01	600		P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C54	.005	200		P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C55	.05	200		P288-05	DF-503	PJS25		PT415	2TM-S5	
C56	3900	500		1464-004		1DR5D4		MCB463	MS-24	
C57	330	500		1469-00035						
C58	330	500		1469-00035						
C59	470	500		1469-0005		5R5T5		MCB245	MS-35	
C60	.05	600		P688-05	DF-503	PTE685		PT615	6TM-S5	
C61	10									
C62	.22	600		684-25		PTE6P25		PT6025	6TM-P25	
C63	.1	600		P688-1		PTE6P1		PT601	6TM-P1	
C64	.05	600		P688-05		PTE685		PT615	6TM-S5	
C65	.01	600		P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C66	500	20000		HV20C	TV3-502	MM-C30TS	413-501		20DK-T5	
C67A	5000			BPD-005	DD-2-502	TM5D5	811-005	DC-525	5HK-D5	
B	5000			BPD-005		TM5D5	811-005	DC-525	5HK-D5	
C68	.5-3				829-3			CT565A		

⌀ Items C43A, C43B, C43C, R60A, R60B, R60C are combined in one unit.

CONTROLS

ITEM No	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: JEWEL PART No	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2000Ω	½	50T10	*	RTV-87		UF23L	Contrast-Panel
B	1 Meg	½					UB18A	Volume-Rear
C	Switch						UB-20	Attach to R1B
R2A	1 Meg	½	50T13	Q11-137	AG-61-8	AB-89	U-54	Vert.Hold
B	Shaft		Not Req.	Not Req.	K88-3	AK-4	Not Req.	Attach to R2A
R3A	2500Ω	½	50T11	Q11-113	AG-15-8	AB-7	U-8	Brightness
B	Shaft		Not Req.	Not Req.	K88-3	AK-4	Not Req.	Attach to R3A
R4A	150KΩ	½	50T14	Q11-133	AG-44-8	AB-31	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	K88-3	AK-4	Not Req.	Attach to R4A
R5A	5000Ω	2	50T3	W-5000	A63-5000		R5000L	Vert Linearity-Wire Wound
B	Shaft		Not Req.	Not Req.	FK8-1/4		Not Req.	Attach to R5A
R6A	2.5Meg	½	50T2	Q11-239	AG-84-8	AB-83	SU-565	Vert. Size
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R6A

* CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS B11-110 & P1-128 (Panel)
B13-137 & R1-210 (Rear) & SWITCH S 76-1.

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: JEWEL PART No.	IRC PART No.	NOTES
R7	3900Ω	½		BTS-3900	
R8	47KΩ	½		BTS-47K	
R9	10KΩ	½		BTS-10K	
R10	2200Ω	½		BTS-2200	
R11	4700Ω	½		BTS-4700	
R12	220KΩ	½		BTS-220K	
R13	15KΩ	½			
R14	10KΩ	½			
R15	4700Ω	½		BTS-4700	
R16	4700Ω	½		BTS-4700	
R17	82Ω	½		BTS-82	
R18	33KΩ	½		BTS-33K	
R19	100Ω	½		BTS-100	
R20	10KΩ	½			
R21	47Ω	½			
R22	330Ω	½		BTS-330	
R23	100Ω	½		BTS-100	
R24	22KΩ	½			
R25	150Ω	½		BTS-150	
R26	22KΩ	½			
R27	100Ω	½		BTS-100	
R28	100Ω	½		BTS-100	
R29	100Ω	½		BTS-100	
R30	220KΩ	½		BTS-220K	
R31	820KΩ	½		BTS-820K	
R32	100KΩ	½		BTA-100K	
R33	100Ω	½		BTS-100	
R34	4700Ω	½		BTS-4700	
R35	3300Ω	½		BTA-3300	
R36	33KΩ	½		BTS-33K	
R37	1 Meg	½		BTS-1 Meg	
R38	1800Ω	½		BTA-1800	
R39	33000Ω	2		BTS-3300	
R40	47KΩ	½			
R41	100Ω	½		BTS-100	
R42	47KΩ	½			
R43	1000Ω	½		BTS-1000	
R44	47KΩ	½		BTS-47K	
R45	15KΩ	½		BTS-15K	
R46	3.9Ω	½			
R47	33KΩ	½		BTS-33K	
R48	6.8 Meg	½		BTS-6.8Meg	
R49	470KΩ	½		BTS-470K	
R50	470KΩ	½		BTS-470K	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: JEWEL PART No.	IRC PART No.	NOTES
R51	560Ω	1		BTA-560	
R52	470Ω	1		BTA-470	
R53	3300Ω	1		BTA-3300	
R54	56KΩ	½		BTS-56K	
R55	220KΩ	½		BTS-220K	
R56	1.5Meg	½		BTS-1.5Meg	
R57	2700Ω	½		BTS-2700	
R58	3900Ω	½		BTS-3900	
R59	3900Ω	½		BTS-3900	
R60A	22KΩ	½		BTS-22K	
B	8200Ω	½	*	BTS-8200	
C	8200Ω	½		BTS-8200	
R61	1.5Meg	½		BTS-1.5Meg	
R62	470KΩ	½		BTS-470K	
R63	100KΩ	½		BTA-100K	
R64	330KΩ	½		BTS-330K	
R65	12KΩ	½		BTS-12K	
R66	6.8Meg	½		BTS-6.8Meg	
R67	220Ω	½		BTS-220	
R68	47KΩ	½		BTA-47K	
R69	10KΩ	½		BTS-10K	
R70	180KΩ	½		BTS-180K	
R71	330KΩ	½		BTS-330K	
R72	3900Ω	½		BTS-3900	
R73	390Ω	½		BTS-390	
R74	100KΩ	½		BTS-100K	
R75	100KΩ	½		BTS-100K	
R76	3.3Meg	½		BTS-3.3Meg	
R77	470KΩ	½		BTS-470K	
R78	180KΩ	½		BTS-180K	
R79	3900Ω	½		BTS-3900	
R80	180KΩ	½		BTS-180K	
R81	180KΩ	½		BTS-180K	
R82	2200Ω	½		BTS-2200	
R83	470KΩ	½		BTS-470K	
R84	100Ω	½		BTS-100	
R85	12KΩ	2		BTB-12K	
R86	8200Ω	½		BTS-8200	
R87	3.3Ω	½			
R88	470KΩ	1			
R89	1500Ω	1		BTA-1500	
R90	2750Ω	10		1 3/4A-3000	
R91	1000	10		1 3/4A-100	

⌀ Items R60A, R60B, R60C, C43A, C43B, C43C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA: JEWEL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	U1VAC ④ 1.5A	600VCT .230ADC	5VAC ⑤ 3A	6.3VAC ④ 1.5A SEC. 4 6.3VAC ⑤ 6.6A					R-39BC

TRANSFORMER (SWEEP CIRCUITS)

ITEM No	RATING: DC RESISTANCE PRI.	SEC.	REPLACEMENT DATA: JEWEL PART No	STANCOR PART No	MERIT PART No	CHICAGO PART No	TRIAD PART No	NOTES
T2	230Ω	110Ω		A-8125	A-3000 ↓	TBO-2 ↓	A-82K ↓	Vert. Osc. Trans.
T3	393Ω tap ② 33Ω	19.3Ω tap ④ .6Ω, 10.3Ω		A-8130 ②	HVO-7 ↓ ③	TFB-5 ④	D-14 ⑤	Horiz. Output Trans.
		SEC. 2						
		0Ω						
T4	720Ω	8Ω		A-8112	A-3038	TSO-9	A-99X	Vert. Output Trans.
T5A	9Ω			DY-8A	MDP-70	TY-2	Y-12	Horiz. Deflection Coils
B	50Ω							Vert. Deflection Coils

① Drill one new mounting hole.
② Use with width coil WC-5
③ Use with width coil MWC-1
④ Use with width coil TWL-1
⑤ Use with width coil WC-11

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	SEC.	DC RES PRI.	SEC.	REPLACEMENT DATA: JEWEL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T6	9KΩ	5.5KΩ	670Ω	1.1Ω	Part of Spkr.	A-3879 ↓	A-2900 ①	RO-16 ↓	S-11X ↓	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V C IMP	REPLACEMENT DATA: JEWEL PART No.	JENSEN PART No	QUAM PART No.	NOTES
SP1	5"	PM	3.5ΩΩ		ST-105 Mod. P5-X	5A07	

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ⁰C)	REPLACEMENT DATA: JEWEL PART No	STANCOR PART No	MERIT PART No	CHICAGO PART No	TRIAD PART No
L1	.200ADC	71Ω	3.6 Hy.		C-2325 ↓		TR-4200 ①	C-15X

↓ Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES PRI.	SEC.	REPLACEMENT DATA: JEWEL PART No.	MERIT PART No.	NOTES
L2	Ant. Coils	0Ω				
L3	Fil. Choke	0Ω				
L4	RF, Mixer Grid & Osc. Coils	0Ω				
L5	Fil. Choke	0Ω				
L6	1st. Video IF	1Ω			TV-103 *	
L7	Fil. Choke	0Ω				
L8	2nd. Video IF	.4Ω	.4Ω			
L9	Fil. Choke	0Ω				
L10	3rd. Video IF	.6Ω	.6Ω			
L11	Fil. Choke	0Ω				
L12	4th. Video IF	.5Ω	.3Ω			
L13	Series Peaking Coil	4.8Ω			TV-181 ■	120 Microhenries, wound on 12KΩ resistor
L14	Shunt Peaking Coil	5.7Ω			TV-184	160 Microhenries
L15	Series Peaking Coil	4.8Ω			TV-181 †	120 Microhenries, wound on 8.2KΩ resistor
L16	Series Peaking Coil	4.8Ω			TV-181 †	120 Microhenries, wound on 8.2KΩ resistor
L17	Shunt Peaking Coil	4.6Ω			TV-181	120 Microhenries
L18	Sound IF	4.8Ω				Tapped ⑥ 4Ω
L19	Ratio Det.	5.5Ω	.8Ω CT		TV-115	Tertiary Winding - .2Ω
L20	Horiz. Osc.	85Ω			TV-163	
L21	Width Coil	1Ω			MWC-2 *	* Enlarge mtg. hole
L22	Horiz. Lin.	36Ω			MWC-2 *	

■ Parallel with 1.2KΩ resistor
† Parallel with 8.2KΩ resistor

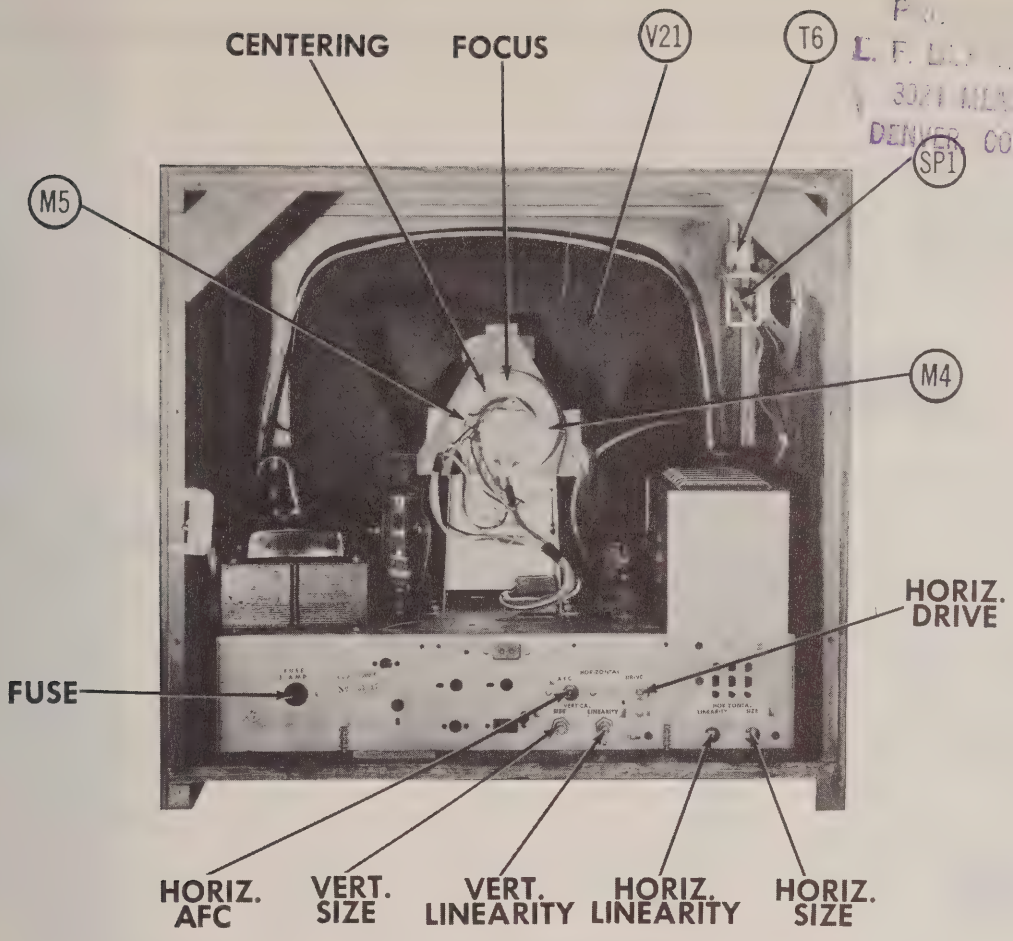
FUSES

ITEM No	TYPE	RATING	REPLACEMENT DATA: JEWEL PART No FUSE	JEWEL PART No HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No FUSE	BUSS PART No HOLDER
M1	MDL	3A 125V			313003	341001	MDL-3	HKP
M2	GJV	1.4A 250V			318 250 (P T)		GJV-1/4	

MISCELLANEOUS

ITEM No.	PART NAME	JEWEL PART No.	NOTES
M3	RF Tuner		Standard Coil
M4	Focus Magnet	63T19	
M5	Ion Trap	63T17	
B2	Trimmer		Horizontal Drive (25-220MMF)

JEWEL MODELS 17C9, 17T9, 17TW7, 21C9, 21T9 Tel. Rec.



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L. F. [illegible] VIP
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CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control at the middle of its range and adjust the horizontal frequency slug (B1) for horizontal synchronization.

Check to see that the sync range of the horizontal hold control is centered by switching off channel and back again with the horizontal hold at both extremes of its rotation. Make slight readjustment of B1 to center the sync range, if necessary.

Adjust the horizontal drive trimmer (B2) in a counterclockwise direction as far as possible without compression of center of the picture or presence of vertical white lines. If neither indication appears, leave trimmer at minimum capacity consistent with sufficient compression of trimmer plates.

Adjust the width slug (B3) for a picture slightly wider than necessary to fill the picture mask.

Adjust the horizontal linearity slug (B4) for a picture that is symmetrical from left to right.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push on type control knobs from front panel.
2. Remove 7 wood screws. Remove rear cover.
3. Disconnect built-in antenna & speaker.
4. Remove 2 wood screws. Remove antenna bracket.
5. Remove 6 chassis bolts. Remove chassis.
6. Remove 2 speaker nuts. Remove speaker.

NOTE: FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE CHASSIS AS OUTLINED ABOVE.

MASCO
MODEL JM-10

MASCO
MODEL JM-10

TRADE NAME	Masco Model JM-10
MANUFACTURER	Mark Simpson Mfg. Co., Inc., 32-28 49th. St., Long Island City 3, N.Y.
TYPE SET	AC-DC Operated Intercommunication System Master Unit.
TUBES (Two)	Types 12SJ7 AF Amp., 50L6GT Audio Output
POWER SUPPLY	110-120 Volts AC/DC RATING .25 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

MASCO
MODEL JM-10

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		MASCO PART No.	STANDARD REPLACEMENT		
V1	Pre Amplifier	12SJ7	12SJ7	8N	
V2	Audio Output	50L6GT	50L6GT	7AC	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MASCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	40	150		PRS150/50-30-20		EDL44215		3N532	TVA-3448	Red
B	40	150								Red
C	20	150								Blue
C2	10	50		PRS50/10		BR105		TC32	TVA-1304	
C3	.01	600		P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C4	.005	600		P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C5	.005	600		P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C6	470			S1470	D6-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C7	.1	600		689ZGXY-1		PJ6P1		PT601	6TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MASCO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	34-011-182	Q13-133	AG-60-Z	B-60-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MASCO PART No.	IRC PART No.	
R2	18Ω	½			
R3	15 Meg	½		BTS-15 Meg	
R4	1 Meg	½		BTS-1 Meg	
R5	270KΩ	½		BTS-270K	
R6	150Ω	½		BTS-150	
R7	2200Ω	½		BTS-2200	

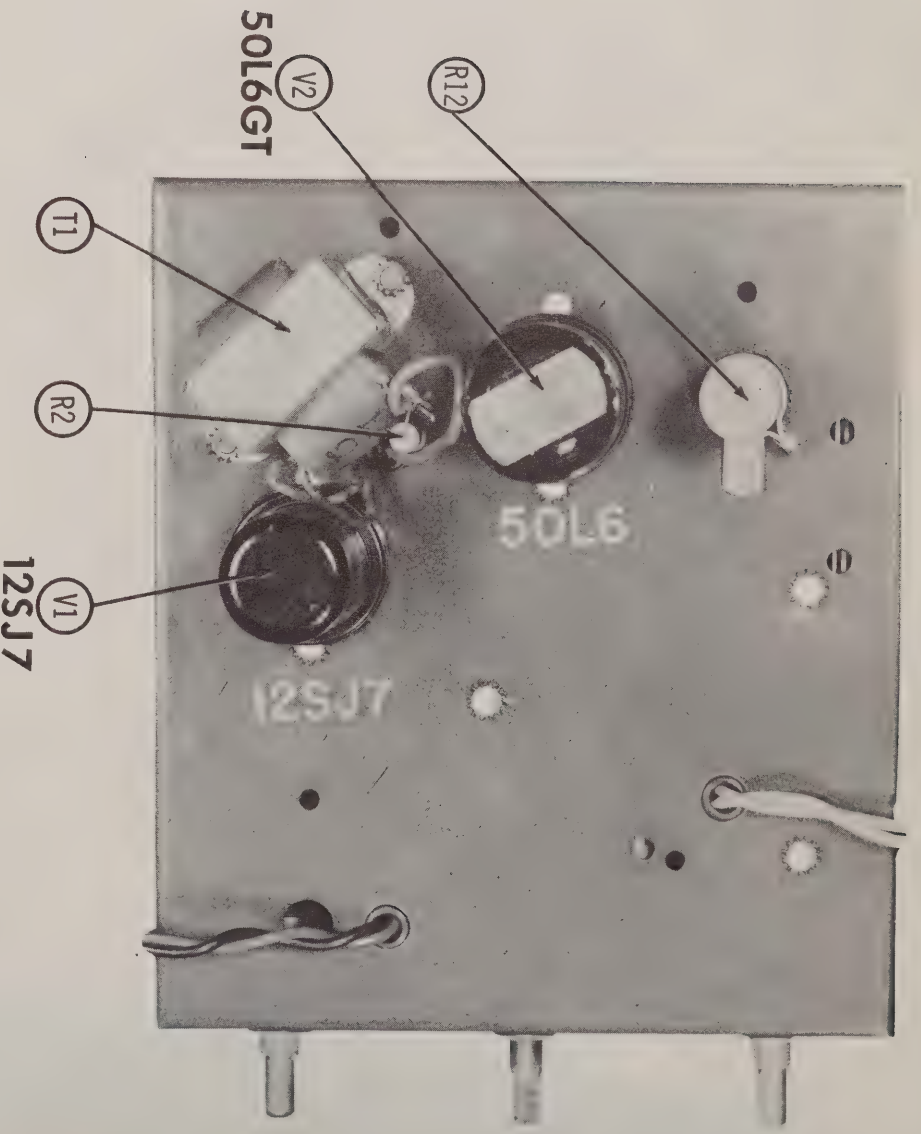
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PART No.	IRC PART No.	
R8	47KΩ	½		BTS-47K	
R9	150Ω	½		BTS-150	
R10	47K Ω	½		BTS-47K	
R11	47Ω	1			Note
R12	390Ω	10		1 3/4A-400	

Note. Some models use a 20Ω resistor in this application.

TRANSFORMER (INPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		MASCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T1	11.8Ω	15KΩ	.57Ω	700Ω	13-1N-20					

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		MASCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T2	1.66KΩ	11.8Ω	132Ω	1.18Ω	13-0-2C		A-2902			

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MASCO PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	11.8Ω	42M-2 4AM-61 ①		4A07Z12	① Alternate speaker

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT	MASCO PART No.	SYLVANIA PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	
M1	.053		NC-5	5M1	1004A	6S100	

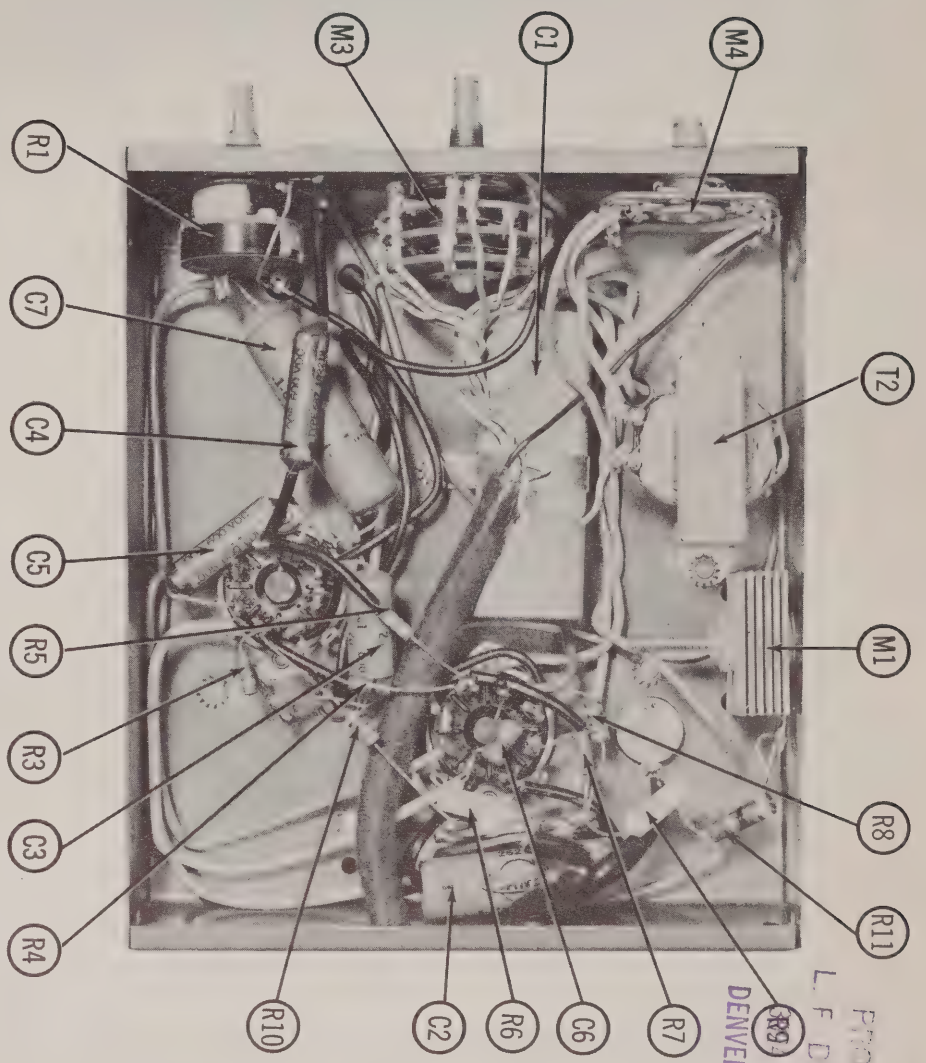
DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					MASCO PART No.		
M2	Bayonet			White			Neon Type NE51

MISCELLANEOUS

ITEM No.	PART NAME	MASCO PART No.	NOTES
M3	Switch		Station Selector
M4	Switch		Talk-Listen

CHASSIS—BOTTOM VIEW



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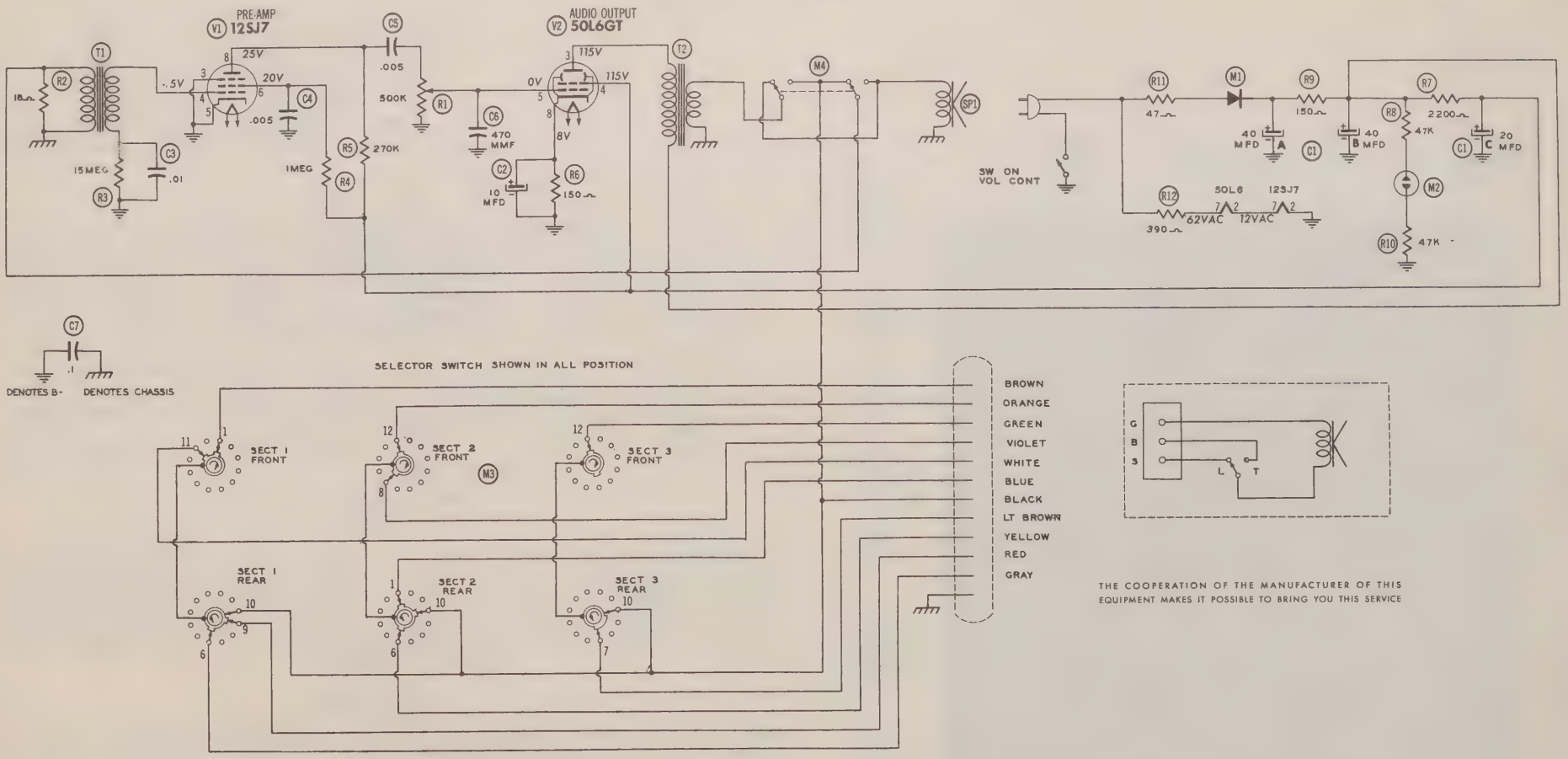
MASCO MODEL JM-10



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RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SJ7	0Ω	0Ω	0Ω	15Meg	0Ω	†1Meg	12Ω	†270KΩ
V 2	20L6GT	0Ω	12Ω	†302Ω	†2.4KΩ	0Ω	†47KΩ	62Ω	150Ω

ALL MEASUREMENTS TAKEN WITH STATION SELECTOR SWITCH IN "ALL" POSITION
LISTEN & TALK SWITCH IN "LISTEN" POSITION
†' MEASURED FROM OUTPUT OF M1

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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187–8

1 - DC Voltage measurements are at 20,000 ohms per volt, AC Voltage measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

PHOTOFACT* Folder

*TRADE MARK

PACKARD-BELL
MODELS 2421, 2422, 2423

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MODEL 2421

PACKARD-BELL
MODELS 2421, 2422, 2423

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DATE 12-52 SET 187 FOLDER 9

PACKARD-BELL 2421

TRADE NAME	Packard-Bell Models 2421, 2422, 2323
MANUFACTURER	Pakcard-Bell Co. Service Div., 11th. & Hope Sts., Los Angeles 15, Calif.
TYPE SET	Television Receiver
TUBES	Twenty-four
POWER SUPPLY	110-120 Volts AC-60 Cycle
RATING	1.86 Amp @ 117 Volts AC
TUNING RANGE—	Channels 2 thru 13

INDEX

Alignment Instructions 6
Disassembly Instructions 10
Horizontal Sweep Circuit Adjustments 10
Parts List and Descriptions 12, 13, 15
Photographs
Cabinet - Rear View 10
Capacitor and Alignment Identification 4, 9
Chassis - Top View 3
Photographs (Con't)
RF Tuner 7
Resistor and Inductor Identification 11, 14
Resistance Measurements 8
Schematic 2
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

PACKARD-BELL
MODELS 2421, 2422, 2423

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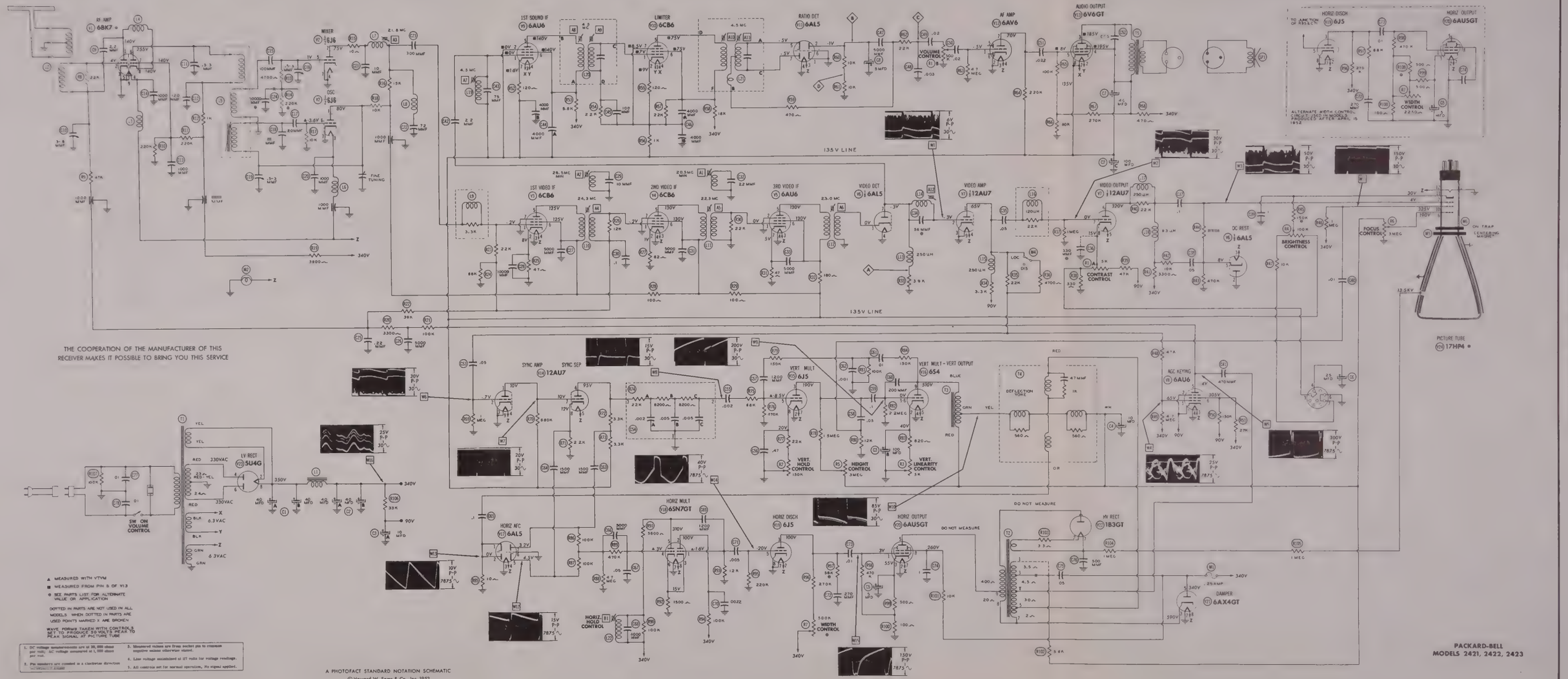

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MODELS 2421, 2422, 2423

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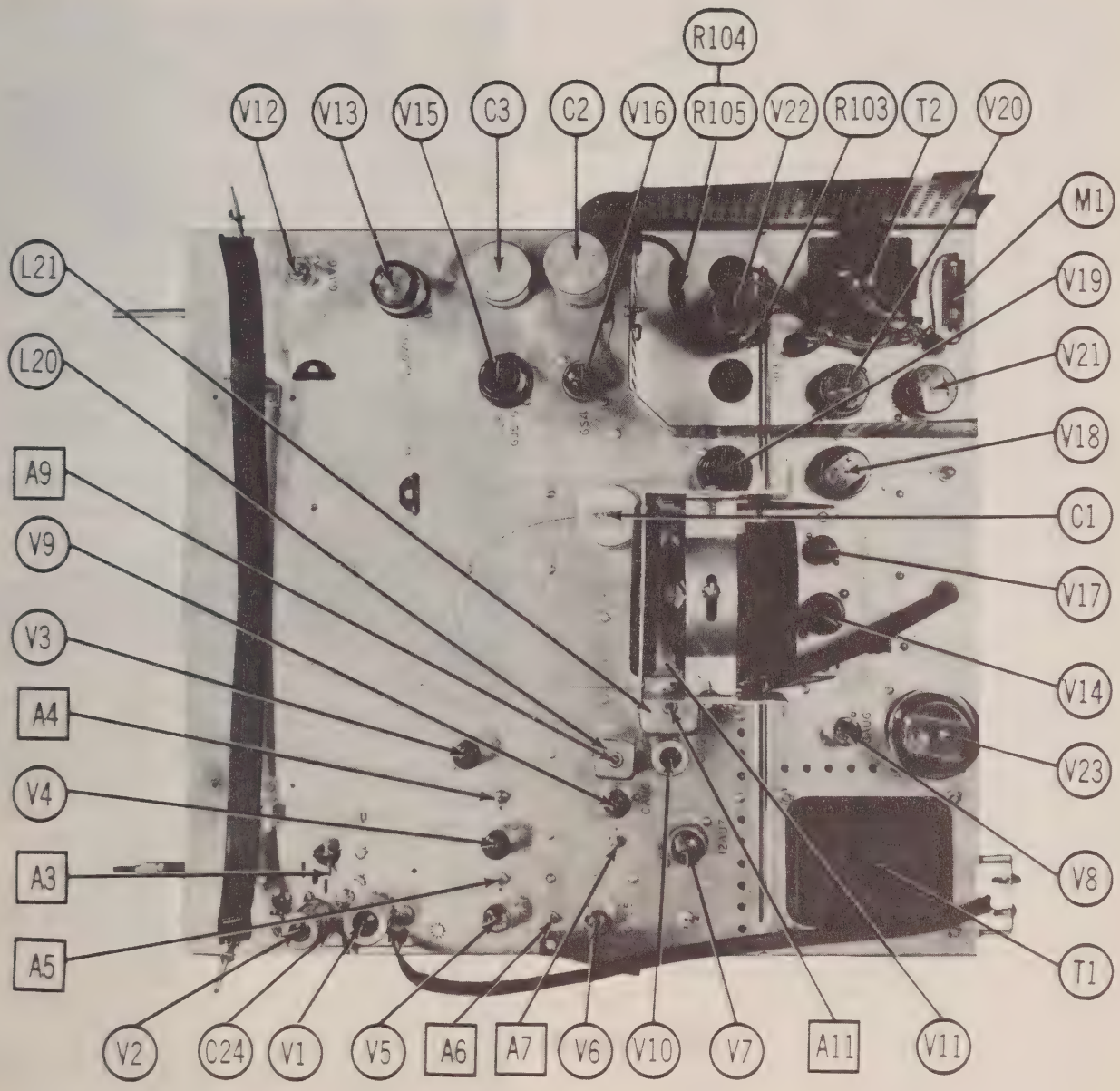
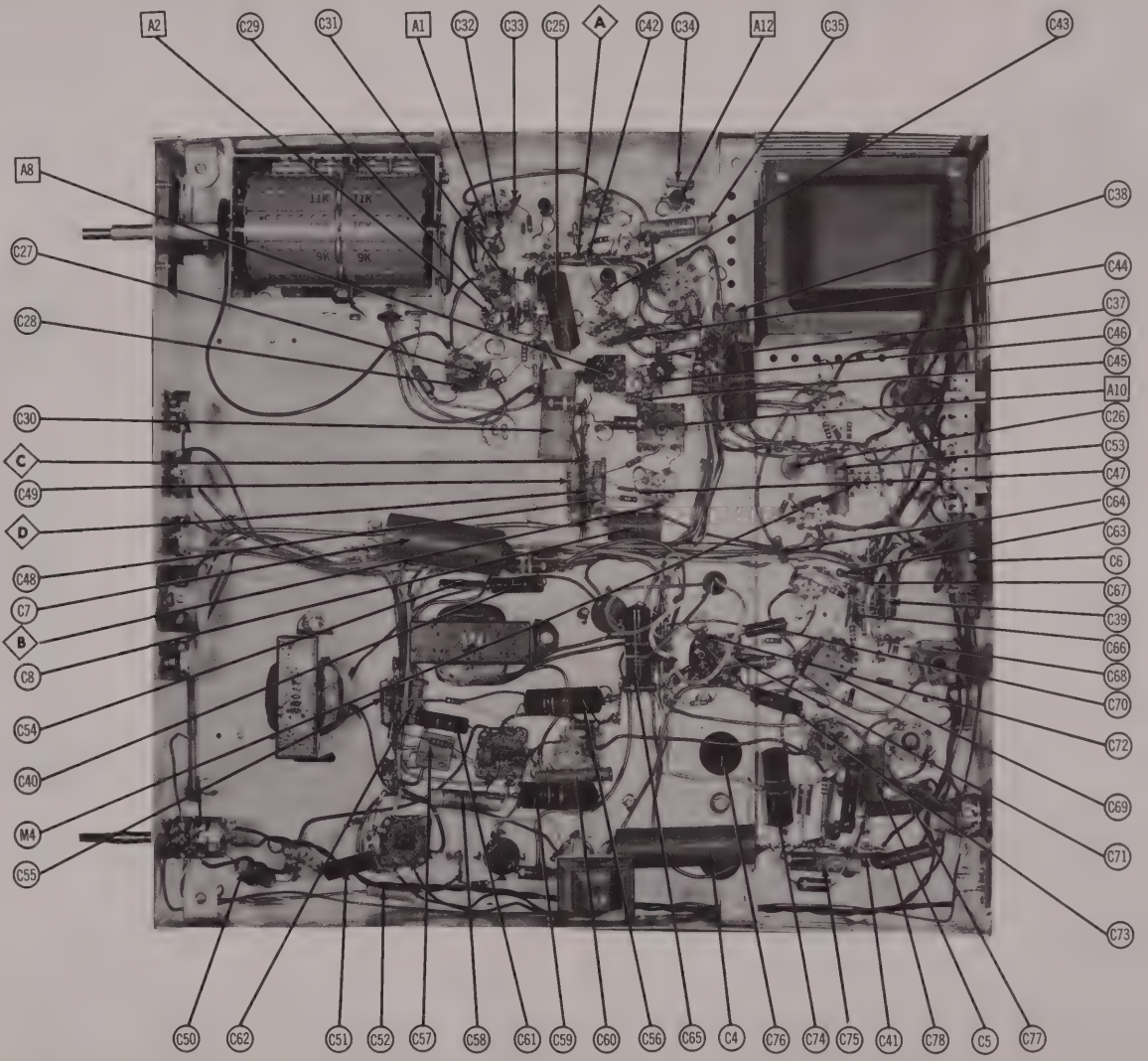
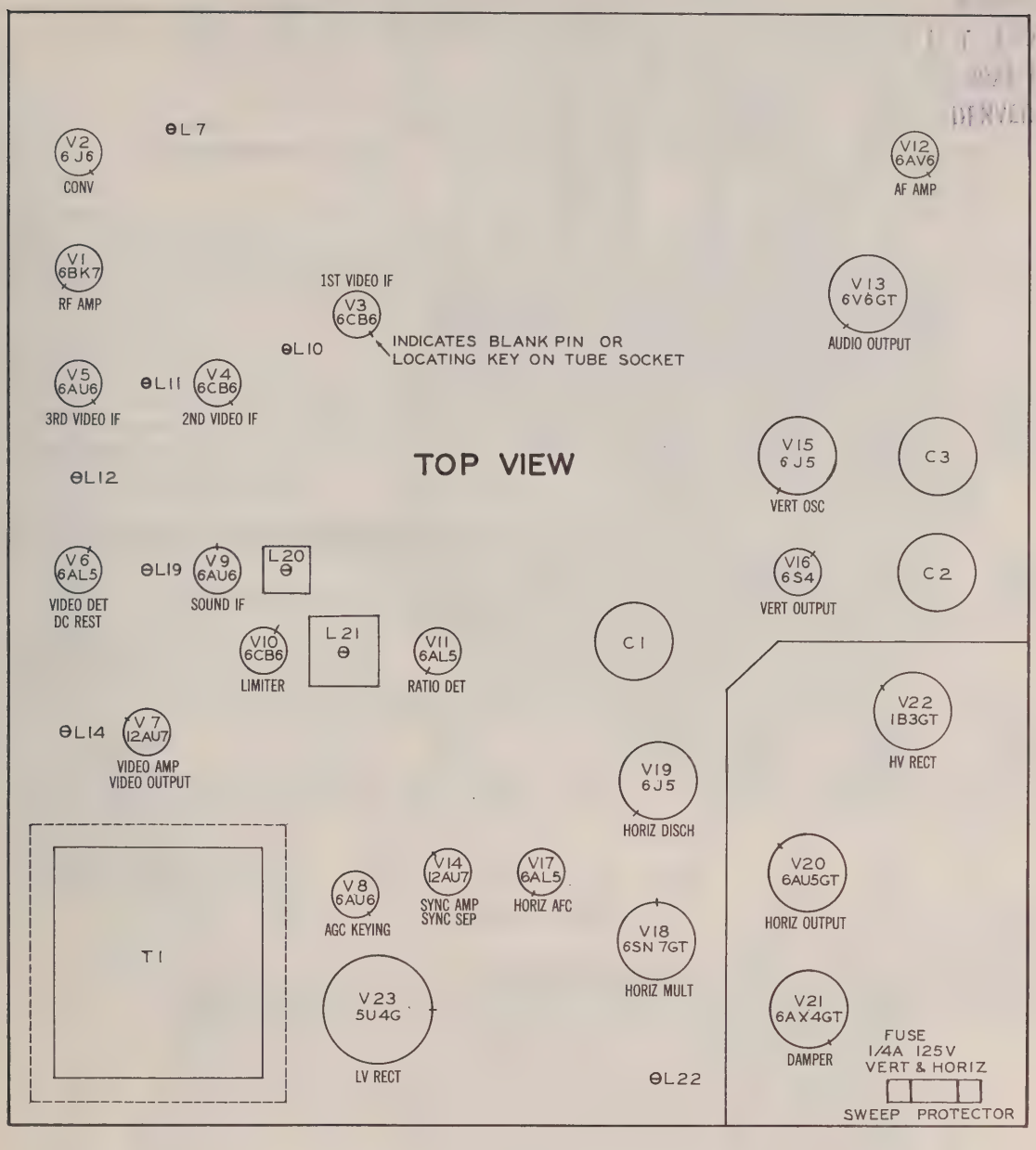


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptons. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-V23

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5, V6, V13
No pic, no sound, has snow-V1, V2, V3
No pic, has sound, has raster-V6, V7, V24
Has pic, no sound-V9, V10, V11, V12, V13
Overloaded picture-V8

SYNC FAILURE
No vert. sync.-V14, V15, V16
No horiz. sync-V14, V17, V18
No vert. or horiz. sync-V14

SWEEP FAILURE
No raster, has sound-V18, V19, V20, V21, V22, V24 Fuse (M1)
No vertical deflection-V16
Poor vert. linearity or foldover-V15, V16
Poor horiz. linearity or foldover-V18, V19, V20, V21
Narrow picture-V18, V19, V20, V21, V22, V23
Vert. off freq.-V14, V15, V16
Horiz. off freq.-V14, V17, V18

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal discharge tube, V19.

VIDEO IF ALIGNMENT

Remove the converter tube, V2, from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to the ungrounded side of C25. Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis	20.5MC (Unmod)	Any	DC probe to point (A) Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	26.5MC	"	"	A2	"
3.	"	"	21.8MC	"	"	A3	Adjust for maximum deflection.
4.	"	"	24.3MC	"	"	A4	"
5.	"	"	22.3MC	"	"	A5	"
6.	"	"	23.0MC	"	"	A6	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	23MC (10MC Swp)	20.5MC 21.8MC 25.0MC 26.5MC	Any	Vert. Amp. to point (A). Low side to chassis.		Check for response curve similar to fig. 1. If necessary retouch A3 thru A6 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.001MFD	High side to point (A) Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B) Common to chassis.	A7, A8, A9, A10	Adjust for maximum deflection.
9.	"	"	"	"	DC probe to point (C) Common to point (D)	All	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. amp. to point (B). Low side to chassis.	A7, A8 A9, A10	Disconnect stabilizer capacitor C8. Adjust for curve of maximum amplitude and symmetry as in fig. 2.
9.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	All	Reconnect capacitor C8. Adjust so that 4.5MC occurs at center of crossover lines as in fig. 3. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

Turn the receiver on and tune to a TV signal.
Observe the picture for evidence of 4.5MC beat interference. If present, adjust A12 for minimum interference.

TUNER ALIGNMENT

The tuner portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

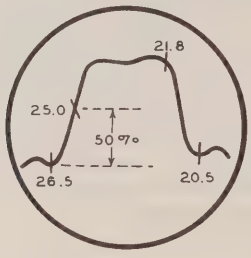


FIG.1

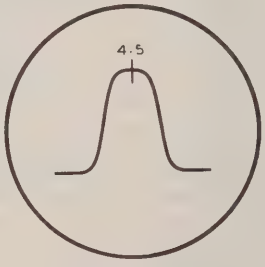


FIG. 2

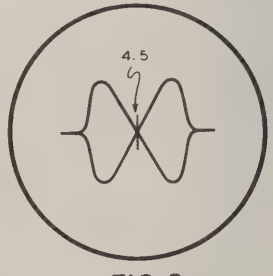
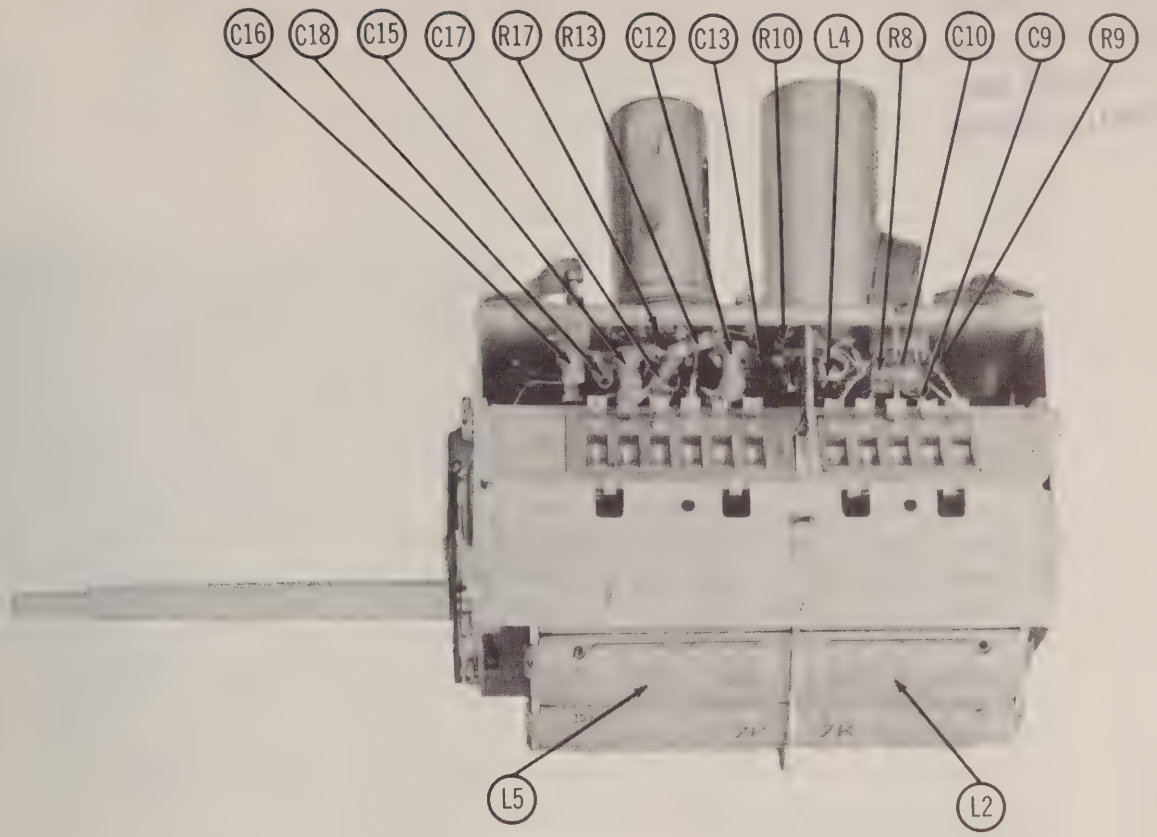
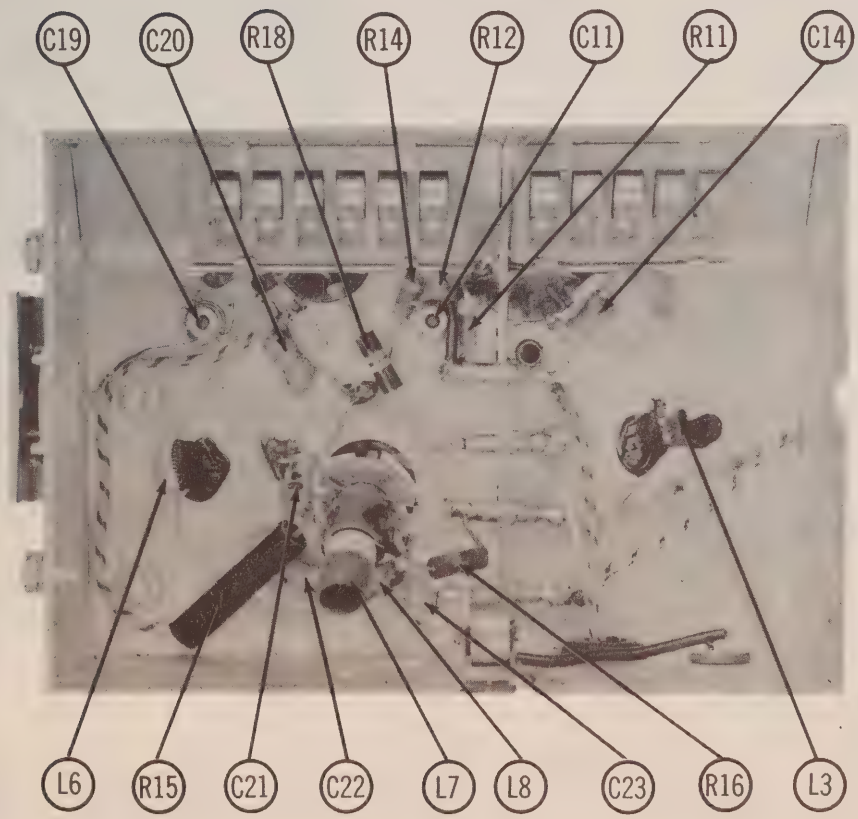


FIG. 3



RF TUNER-RIGHT SIDE

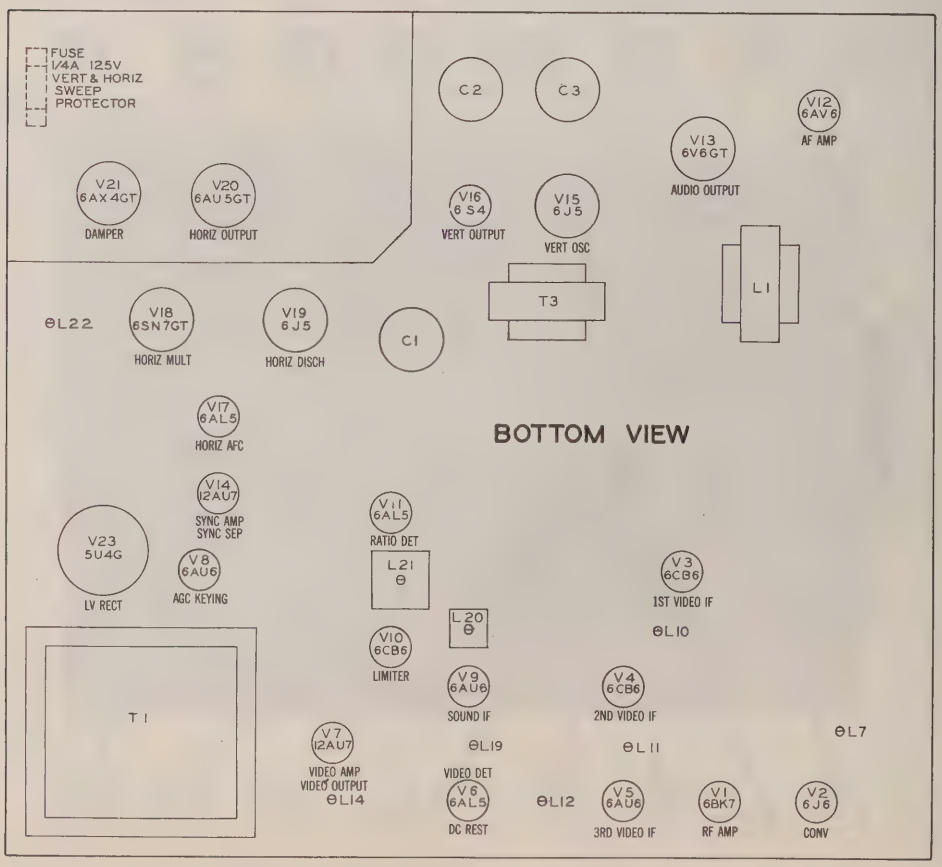


RF TUNER-BOTTOM VIEW

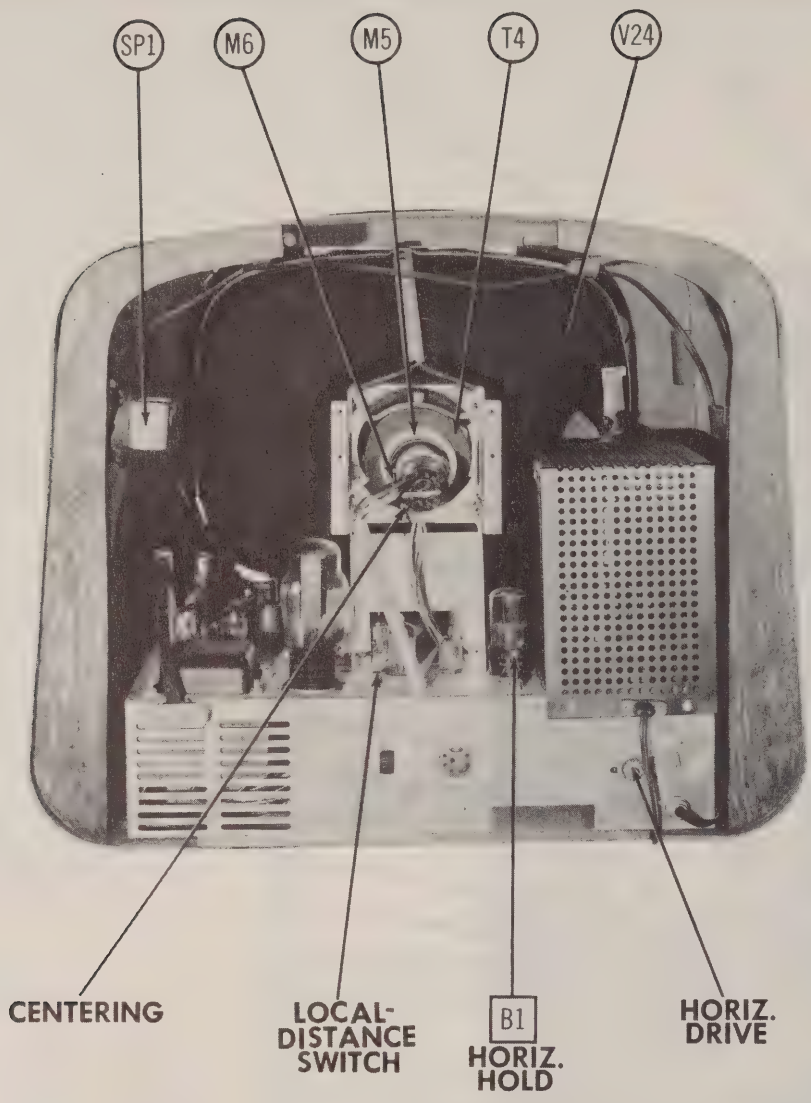
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BK7	INF	155KΩ	0Ω	.1Ω	0Ω	†4.9KΩ	110KΩ	INF	0Ω
V 2	6J6	■10KΩ	■15KΩ	.1Ω	0Ω	220KΩ	10KΩ	0Ω		
V 3	6CB6	90KΩ	47Ω	0Ω	.1Ω	■200Ω	■200Ω	0Ω		
V 4	6CB6	68KΩ	82Ω	.1Ω	0Ω	■100Ω	■100Ω	0Ω		
V 5	6AU6	.2Ω	0Ω	.1Ω	0Ω	■180Ω	■180Ω	47Ω		
V 6	6AL5	.2Ω	0Ω	.1Ω	0Ω	470KΩ	0Ω	3.9KΩ		
V 7	12AU7	-†36KΩ	3.9KΩ	0Ω	.1Ω	.1Ω	†3.3KΩ	1 Meg	900Ω	0Ω
V 8	6AU6	†105KΩ	†33KΩ	.1Ω	0Ω	210KΩ	†22KΩ	†33KΩ		
V 9	6AU6	■1.1Ω	■0Ω	■0Ω	■.2Ω	†5.6KΩ	†5.6KΩ	■120Ω		
V 10	6CB6	■23KΩ	■1.1KΩ	■.2Ω	■0Ω	†15KΩ	†15KΩ	■1KΩ		
V 11	6AL5	0Ω	20KΩ	.1Ω	0Ω	INF	0Ω	INF		
V 12	6AV6	4.7Meg	0Ω	0Ω	.1Ω	INF	INF	■220KΩ		
V 13	6V6GT	INF	■.2Ω	†906Ω	† 511Ω	200KΩ	100K Ω	■0Ω	50KΩ	
V 14	12AU7	■680KΩ	1 Meg	0Ω	.1Ω	.1Ω	■6.6KΩ	■680KΩ	2.2KΩ	0Ω
V 15	6J5	0Ω	0Ω	#1.8Meg	#300KΩ	470KΩ	#150KΩ	.1Ω	80KΩ	
V 16	6S4	INF	3.8KΩ	2.2Meg	0Ω	.1Ω	2.2Meg	INF	INF	#7.3KΩ
V 17	6AL5	10Ω	10Ω	0Ω	.1Ω	4.8Meg	0Ω	4.8Meg		
V 18	6SN7GT	12KΩ	†100KΩ	1.5KΩ	5.1Meg	†5.7KΩ	1.5KΩ	0Ω	.1Ω	
V 19	6J5	0Ω	.1Ω	†470KΩ	†41Ω	220KΩ	†520KΩ	0Ω	0Ω	
V 20	6AU5GT	470KΩ	0Ω	600Ω	INF	#20Ω	INF	.1Ω	†10KΩ	
V 21	6AX4GT	INF	INF	450KΩ	INF	†41Ω	INF	0Ω	.1Ω	
V 22	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								Top Cap #420Ω
V 23	5U4G	INF	30KΩ	INF	23Ω	INF	24Ω	INF	30KΩ	
V 24	17HP4	0Ω	940KΩ	Pin 6 270KΩ	Pin 10 †1 Meg	Pin 11 160KΩ	Pin 12 .1Ω			

ALL CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED
LOCAL & DISTANCE IN "LOCAL" POSITION
† MEASURED FROM PIN 8 FOF V23
# MEASURED FROM PIN 3 OF V21
■ MEASURED FROM PIN 8 OF V13



TUBE PLACEMENT CHART



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal hold slug (B1) until the picture synchronizes horizontally. Picture should return to sync after momentarily switching to another channel and back. If necessary retouch B1 slightly for this condition.

Adjust the horizontal drive control for the best horizontal linearity of pattern.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push on type control knobs from front panel.
2. Remove 8 wood screws. Remove rear cover.
3. Disconnect speaker. Remove 4 speaker nuts. Remove speaker.
4. Remove 4 chassis bolts. Remove chassis.

NOTE: FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE CHASSIS AS OUTLINED ABOVE .

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1A	RF Amplifier	6BK7	6BK7	9AJ	
B	RF Amplifier	6BQ7	6BQ7	9AJ	
V2	Converter	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6AU6	6AU6	7BK	
V6	Video Detector-DC Restorer	6AL5	6AL5	6BT	
V7	Video Amplifier-Video Output	12AU7	12AU7	9A	
V8	AGC Keying	6AU6	6AU6	7BK	
V9	Sound IF Amp.	6AU6	6AU6	7BK	
V10	Limiter	6CB6	6CB6	7CM	
V11	Ratio Det.	6AL5	6AL5	6BT	
V12	AF Amplifier	6AV6	6AV6	7BT	
V13	Audio Output	6V6GT	6V6GT	TAC	
V14	Sync Amplifier Sync Separator	12AU7	12AU7	9A	
V15	Vert. Mult.	6J5	6J5	6Q	
V16	Vert. Mult.- Vert. Output	6B4	6B4	9AC	
V17	Horiz. AFC	6AL5	6AL5	6BT	
V18	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V19	Horiz. Discharge	6J5	6J5	6Q	
V20	Horiz. Output	6AU5GT	6AU5GT	6CK	
V21	Damper	6AX4GT	6AX4GT	4CG	
V22	HV Rectifier	1B3GT	1B3GT	2C	
V23	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: SYLVANIA PART No.		RTMA BASE TYPE	NOTES
V24A	17HP4	17HP4		12C	① Circuit changes necessary
B	20HP4A	20HP4A		12C	
		20HP4	①	12C	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: MALLORY PART No.	REPLACEMENT DATA: SPRAGUE PART No.	NOTES
C1A	▲40	450	24067	AFH2-57		UPT4445		FP338	TVL-2784	
B	▲40	450								
C2A	▲40	450	24055	AFH3-159		UPT4450-1020		FP375	TVL-3764	
B	▲40	450								
C	▲100	200								
C3A	▲10	450	24062	AFH2-93		UPT204		FP255	TVL-2810	
B	▲100	50								
C4	10	600	24068	PHS600/10		BRHV610		TC92	TVA-1955	
C5	5	150	24037	PHS150/4		BR415		TC40	TVA-1402	
C8	25	25	24006	PHS25/25		BR252A		TC26	TVA-1205	
C7	40	350	24063	PHS450/40		BR4035		TC76	TVA-1611	
C8	5	50	24038	PHS150/4		BR550		TC39	TVA-1303	
C9	2.2				TCZ-2.2		NP0K-2R2			5TCCB-V22
C10	3-8				829-10					
C11	.5-3				829-3				C7565A	
C12	120			SI120	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C13	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C14	1000			SI1000	D6-103	TM5D1	GP2L-102	UC-521	5HK-D1	
C15	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C16	.5-3				829-3			C7565A		
C17	30			SI30NP0	TCZ-30		NP0K-300	ZT-543	5TCC-Q2	
C18	10			SI10N750	TCN-10		N750K-100	NT-541	5TCU-Q1	
C19	.5-3				829-3					
C20	1000			SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C21	10			SI10N750	TCN-10		N750K-100	NT-541	5TCU-Q1	
C22	72									
C23	300			SI300	D6-301		GP2K-301	UC-533	5GA-T3	
C24	10000		23939	BPD-01	DD-103	TM5S1	831-01	DC-511	5HK-S1	Note 1
C25	.22	400	23018	P488-22		PTE4SP22		PT4025	4TM-S22	
C26	5000		23931	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C27	5000		23931	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C28	10000		23939	BPD-01	DD-103	TM5S1	831-01	DC-511	5HK-S1	
C29	10			SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C30	1	100	23040	485-1		PJ2W1		PT41	2TM-ML	
C31	5000		23931	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C32	33				TCZ-33		NP0K-220		5TCC-Q22	
C33	5000		23931	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C34	56				TCZ-56		NP0L-560			Note 2
C35	.05	600	23010	P688-05	DF-503	PTE685		PT615	6TM-S5	
C36	330		23944	SI330	D6-331		GP2K-331	UC-5333	5GA-T33	Note 1
C37	.1	600	23012	P688-1	DF-104	PTE69P1		PT601	6TM-P1	
C38	.05	600	23010	P688-05	DF-503	PTE685		PT615	6TM-S5	
C39	.1	200	23012	P288-1	DF-104	PJ3P1		PT401	2TM-P1	
C40	.01	600	23008	P688-01	D6-103	PTE68I	GP2-333-103	PT601	6TM-S1	
C41	.470	1000	23967					MCK347		5TCCB-V22
C42	2.2		23952		TCZ-2.2		NP0K-2R2			
C43	75									
C44A	4000		23955	BPD-2X004	D6-402	TM5DD4	822-004	DCD-524	5HK-2D4	
B	4000				D6-402					
C45	100		23934	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C46A	4000		23955	BPD-2X004	D6-402	TM5DD4	822-004	DCD-525	5HK-2D4	
B	4000				D6-402					
C47	5000		23931	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C48	.003	600	23016	P688-003	D6-502	PTE6D3	GP2-333-302	PT623	6TM-D3	
C49	.02	600	23007	P688-02	DF-203	PTE682		PT612	6TM-S2	
C50	.02	600	23007	P688-02	DF-203	PTE682		PT612	6TM-S2	

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: MALLORY PART No.	REPLACEMENT DATA: SPRAGUE PART No.	NOTES
C51	.022	600	23007	P688-022	DF-303	PTE6S22		PT623	6TM-D22	
C52	.005	600	23004	P688-005	D6-503	PTE6D5	GP2-333-502	PT635	6TM-D5	
C53	.05	200	23017	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C54A	.002			P688-002		PTE6D3		PT602		
B	.005		▲23951	P688-005	▲PC-100	PTE6D5	▲t405-01	PT625	▲t01C1	
C	.005			P688-005		PTE6D5		PT625		
C55	.002	600	23002	P688-002	D6-202	PTE6D2	GP2-333-202	PT602	6TM-D2	
C56	.47	200	23035	P288-47		PJ2P5		PT405	2TM-P47	
C57	1200	500	23219							
C58	.05	600	23010	P688-05	DF-503	PTE685		PT615	6TM-S5	
C59	.1	600	23012	P688-1	DF-104	PTE69P1		PT601	6TM-P1	
C60	200	2000	23958							
C61	.01	600	23006	P688-01	D6-103	PTE68I	GP2-333-103	PT611	6TM-S1	
C62	.001	600	23001	P688-001	D6-102	PTE6D1	GP2L-103	PT621	6TM-D1	
C63	1500		23936	SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C64	1500		23936	SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C65	.1	600	24068	P688-1	DF-104	PTE69P1		PT601	6TM-P1	
C66	5000		23931	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C67	.05	200	23017	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C68	4000	500	23208	1DRD4		1DRD4		MCM463	MB-24	
C69	1200	500	23291							
C70	.0022	600	23002	P688-0022	D6-222	PTE6D22	GP2-333-222	PT6222	6TM-D22	
C71	.005	600	23004	P688-005	D6-502	PTE6D5	GP2-333-502	PT635	6TM-D5	
C72	270		23943	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C73	.01	600	23023	P688-01	D6-103	PTE68I	GP2-333-103	PT611	6TM-S1	
C74	.1	600	23012	P688-1	DF-104	PTE69P1		PT601	6TM-P1	
C75	.05	600	23010	P688-05		PTE68S		PT615	6TM-S5	
C76	500	20000	23959	HV20C	TV3-502	MMC-20TS	413-501		20DK-T5	
C77	.01	25VAC	23932	4892GXY-01		PJ4S1		PT411	4TM-S1	
C78	.01	25VAC	23932	4892GXY-01		PJ4S1		PT411	4TM-S1	

Note 1. Not used in all Models.
Note 2. Some Models use 50MMF in this application (Part #23922)
Note 3. Some Models use 100MMF in this application (Part #23923)
* Items C54A, C54B, C54C, R74A, R74B, R74C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: MALLORY PART No.	INSTALLATION NOTES
R1A	5000Ω	½	25835A	QJ-36 *	RTV-212	SBB-527-8	UF52R	Contrast-Panel
B	500KΩ	½					UR55A	Volume -Rear
C	Switch						US-26	Attach to R1B
R2A	150KΩ	½	25839C	QH-129	AG-52-8	AB-46	U-43	Vert. Hold
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R2A
R3A	5000Ω	4	25807C		A10-5000	BVP-589	M5MP	Vert. Linearity-Wire Wound
B	Shaft		Not Req.		FKS-1/4	Not Req.	Not Req.	Attach to R3A
R4A	100KΩ	½	23844	QH-128	AG-49-8	AB-40	SU-41	Brightness
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R4A
R5A	3 Meg	½	23805D	QH-140	AG-84-8	AB-84	SU-59	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R5A
R6A	3 Meg	½	23805D	QH-140	AG-84-8	AB-84	SU-59	Focus
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	500KΩ	½	25832	QH-133	AG-58-8	AB-59	SU-50	Width - See Note
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R7A

Note. Some models use alternate control (Resistance-225Ω).
* CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS B17-114, & P1-112 (Panel) B13-133 & R2-204 (Rear) & SWITCH 76-1.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R8	22K↓	½			
R9	47KΩ	½			
R10	220KΩ	½			
R11	220KΩ	½			
R12	1000Ω	½		BTS-1000	
R13	4700Ω	½		BTS-4700	
R14	220KΩ	½		BTS-220K	Note 4
R15	10Ω	½			
R16	15KΩ	½			
R17	10KΩ	½			
R18	10KΩ	½			
R19	33000Ω	2	73432	BTB-3900	
R20	3300Ω	½	73031	BTS-3300	
R21	100KΩ	½	73149	BTS-100K	
R22	39KΩ	2	73044	BTS-39K	
R23	22KΩ	½	73041		
R24	68KΩ	½	73047		
R25	47Ω	½	73009		
R26	12KΩ	½	73038		
R27	82Ω	½	73012	BTS-82	
R28	1000Ω	½	73013	BTS-100	
R29	100Ω	½	73013	BTS-100	
R30	22KΩ	½	73041		
R31	47Ω	½	73009		
R32	180Ω	½	73016	BTS-180	
R33	3900Ω	½	73032	BTS-3900	
R34	3300Ω	½	73031	BTS-3300	
R35	22KΩ	½	73041	BTS-22K	
R36	4700Ω	½	73033	BTS-4700	
R37	1 Meg	½	73161	BTS-1 Meg	
R38	330Ω	½	73019	BTS-330	
R39	47KΩ	½	73045	BTS-47K	
R40	22KΩ	½	73041	BTS-22K	
R41	3300Ω	2	73431	BTB-3300	
R42	10KΩ	½	73037	BTS-10K	
R43	470KΩ	½	73157	BTS-470K	
R44	470KΩ	½	73157	BTS-470K	
R45	150KΩ	½	73151	BTS-150K	Note 1
R46	1 Meg	½	73161	BTS-1 Meg	
R47	10KΩ	½	73037	BTS-10K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R48	47KΩ	½	73045	BTS-47K	
R49	4.7Meg	½	73169	BTS-4.7Meg	
R50	150KΩ	½	73151	BTS-150K	
R51	27KΩ	½	73042	BTS-27K	
R52	12ΩΩ	1	73014	BTS-120	
R53	5600Ω	1	73234	BTA-5600	
R54	22KΩ	½	73041		
R55	12ΩΩ	1	73014	BTB-120	
R56	1000Ω	½	73035	BTS-1000	
R57	22KΩ	½	73041		
R58	18KΩ	2	73440	BTB-18K	
R59	470Ω	½	73021	BTS-470	
R60	10KΩ	½	73037	BTS-10K	
R61	10KΩ	½	73037	BTS-10K	
R62	22KΩ	½	73041	BTS-22K	
R63	4.7Meg	½	73189	BTS-4.7Meg	
R64	220KΩ	½	73153	BTS-220K	
R65	100KΩ	½	73149	BTS-100K	
R66	180KΩ	½	73052	BTS-180K	
R67	270KΩ	½	73054	BTS-270K	
R68	470Ω	2	73431	BTB-470	
R69	1 Meg	½	73161	BTS-1 Meg	
R70	680KΩ	½	73159	BTS-680K	
R71	2200Ω	½	73029	BTS-2200	
R72	3300Ω	½	73031	BTS-3300	
R73	3300Ω	½	73031	BTS-3300	
R74A	2265Ω	½		BTS-22K	
B	8200Ω	½	▲23951	BTS-8200	
C	8300Ω	½		BTS-8200	
R75	68KΩ	½	73047	BTS-68K	
R76	470KΩ	½	73157	BTS-470K	
R77	22KΩ	½	73041	BTS-22K	
R78	1.5Meg	½	73163	BTS-1.5Meg	
R79	150KΩ	½	73151	BTS-150K	
R80	12KΩ	½	73040	BTS-12K	
R81	100KΩ	½	73147	BTS-100K	
R82	2.2Meg	½	73165	BTS-2.2Meg	
R83	82ΩΩ	1	73224	BTA-820	
R84	150KΩ	½	73151	BTS-150K	
R85	10Ω	1	73201		

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R86	100KΩ	½	73049	BTS-100K	
R87	100KΩ	½	73049	BTS-100K	
R88	4.7Meg	½	73169	BTS-4.7 Meg	
R89	470KΩ	½	73157	BTS-470K	
R90	100KΩ	½	73149	BTS-100K	
R91	5600Ω	1	73034	BTS-5600	
R92	1500Ω	½	73227	BTS-1500	
R93	12KΩ	½	73038	BTS-12K	
R94	100KΩ	1		BTA-100K	
R95	220KΩ	½	73153	BTS-220K	
R96	270KΩ	½	73054	BTS-270K	
R97	56KΩ			BTS 56K	Note 2

Note 1. Some models use a 100KΩ resistor in this application.
Note 2. Some models use a 68KΩ resistor in this application.
Note 3. Not used in all models.
* Items R74A, R74B, R74C, C54A, C54B, C54C are combined in one unit.
Note 4. Some models use a 47000 resistor in this application.

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R98	470KΩ	½	73157	BTS-470K	
R99	500Ω	10	73618	1.0,4A-500	①
R100	100Ω	2	73413	BW 2-100	
R101	10KΩ	2		BTB-10K	
R102	5600Ω	2		BTB-5600	
R103	3.3Ω	1	73291		
R104	1 Meg	½	73396		
R105	1 Meg	1	73398		
R106	33KΩ	2	73443	BTB-33K	
R107	100KΩ	½	73149		
R108	500Ω	5	73617	1 3/4A-500	Note 3

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: Packard Bell PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC ② 1.65A	660VCT 220A	5VAC ③ 3A	6.3VAC ④ 1.75A SEC. 1 ⑤ 5.3VAC ⑥ 8.5A SEC. 2	80043	P-8186 ① ②	P-3078	TP-370 ②	R-39BC

① Parallel the two 6 Volt 5 ampere windings, and use for Sec. 4.
② Drill new mounting holes.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: Packard Bell PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	420Ω	40Ω Tap ▲ 20, 32Ω, 36 5Ω SEC. 2 0Ω	89437				D-19	Horiz. Output Trans.
T3	1694.7Ω		89434	A-8141	A-3039	TSO-12	A-104X	Vert. Output Trans.
T4A	35Ω		29542		MDF-71	TY-7	Y-19	Horiz. Deflection Coils Vert. Deflection Coils
B	45Ω							

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: Packard-Bell PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T5	4.5KΩ	3.5Ω	395Ω	.61Ω	89436 89427 ↓	A-3827	A-2930	RO-8	S-3X	① Alternate audio output trans.

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	NOTES
SP1	8"	PM	3.5Ω	83302 83705 ①	8T-108 Mod. P6-X	6A1	↓ 10" PM Speaker

FILTER CHOKE

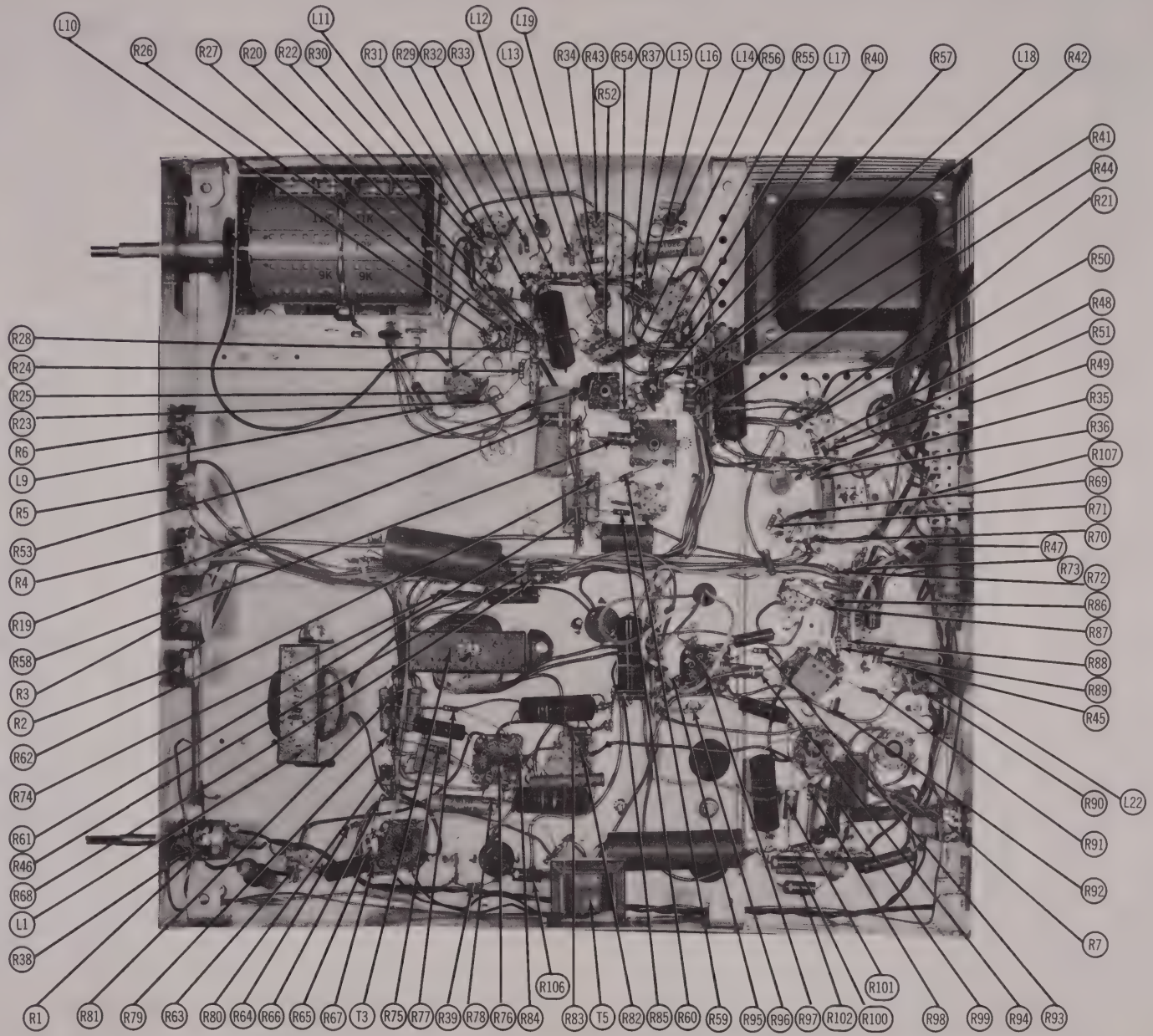
ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ^)	REPLACEMENT DATA: Packard-Bell PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
Ll	.227 A	41Ω	1.62HY	27005	C-2326	C-2996 ↓	TR-1733 ↓	C-17X

① Drill one new mounting hole

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: MERIT PART No.	NOTES
L2	Ant. Coils	0Ω				
L3	Fil. Choke	0Ω				
L4	Neutralizing Coil	0Ω				
L5	RF, Mixer grid & Osc. Coils	0Ω				
L6	Fil. Choke	0Ω				
L7	1st. Video IF	4Ω				
L8	RF Choke	4Ω				
L9	Video IF Coupling	.8Ω		29523		Wound on 3.3kΩ resistor.
L10	2nd Video IF	2Ω	2Ω	29549		Included Trap
L11	3rd Video IF	2Ω	2Ω	29538		Includes Trap
L12	4th. Video IF	2Ω	2Ω	29056		
L13	Shunt Peaking Coil	1Ω			TV-185	250Microhenries

PARTS LIST CONTINUED ON PAGE 15



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS (Continued)

RF-IF COILS (CONT.)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	Packard-Bell PART No.	MERIT PART No.	
L14	4.5MC Trap	1.7Ω		95545	TV-151	
L15	Shunt Peaking Coil	11Ω		29509	TV-185	250Microheneries
L16	Series Peaking Coil	7.5Ω		29506	TV-182	120Microheneries-Wound on 22K resistor
L17	Series Peaking Coil	11Ω		29509	TV-185	250Microheneries
L18	Shunt Peaking Coil	6.4Ω		29507	TV-181	93Microheneries
L19	1st. Sound IF	1.1Ω		29053		
L20	2nd Sound IF	3.2Ω	2Ω	29541	TV-113■	
L21	Ratio Det.	4.4Ω	.2ΩCT	29054	TV-110 *	Tertiary winding-.7Ω
L22	Horiz. Osc.	120Ω		29527	TV-163	

* Drill new mounting holes.
■ Use adaptor plate.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Packard-Bell PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG (Slo-Blo)	1/4A 125V	45005		313.250	357001	MDL-1/4	4405

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					Packard-Bell PART No.		
M2	Bayonet	6-8	.15	Brown			Type #47

MISCELLANEOUS

ITEM No.	PART NAME	Packard-Bell PART No.	NOTES
M3	RF Tuner	10531	
M4	Switch		Local & Distance
M5	Centering Magnet		
M6	Ion Trap	28049	
	Knob	52067-1	Channel Selector (State Color)
	Knob	52068	Fine Tuning (State Color)
	Knob	52069-1	Off/on Volume (State Color)
	Knob	58070	Contrast (State Color)
	Name Plate & Escutcheon	41045	
	Mask	55026-2	For 17" Picture Tubes
	Mask	55034	For 20" Picture Tubes

DENVER, COLORADO

PHILCO
MODELS 53-656, 53-658

PHILCO MODEL 53-656

TRADE NAME	Philco Models 53-656, 53-658
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver
TUBES (Five)	1T4 RF Amp., 1R5 Conv., 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Audio Output
RATING	.12 Amp. @ 117 Volts AC or 50MA @ 9 Volts DC and 16.5MA @ 90 Volts DC
POWER SUPPLY	110-120 Volts AC-DC 9 Volts "A" Supply and 90 Volts "B" Supply
TUNING RANGE—BROADCAST	550-1600 KC SHORT WAVE 1.7MC - 3.4MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Turn tuning gang fully closed and set pointer to last index mark at left hand end of dial back plate.
Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain a output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 6 (grid) of 1R5 (V2). Low side to B-.	265 KC (400~ Mod)	BC	Tuning gang fully open	Across voice coil	A1, A2 A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.		Loop	1630 KC	"	See Remarks	"	A5	Fully open tuning gang and insert .006 inch non-metallic shim between the heel of the rotor and top of the stator plates. Close gang to touch the shim, then remove shim without disturbing the gang setting. Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	580 KC	"	580KC	"	A6	Adjust for maximum output while rocking gang.
4.		"	"	"	"	"	A7	Adjust A7 for maximum output only if dial tracking is off or sensitivity low at this end of dial.
5.		"	1500 KC	"	1500 KC	"	A8, A9	Adjust in order given for maximum output.
6.	Repeat steps 3 and 5 until no improvement is noted.							
7.		"	3000 KC	Special Services	3000 KC	"	A10, A11	Adjust in order given for maximum output.
8.		"	1900 KC	"	1900 KC	"	A12	Adjust for maximum output.
9.	Repeat steps 7 and 8, then repeat step 5.							

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		PHILCO PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	1T4	1T4	6AR	
V2	Converter	1R5	1R5	7AT	
V3	IF Amplifier	1U4	1U4	6AR	
V4	Det.-AVC-AF Amp.	1U5	1U5	6BW	
V5	Audio Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲60	150	30-2568-58							
B	▲10	150								
C	■60	150								
D	60	150								
C2	100		62-110009001	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C3	.05	200	61-0122	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C4	.05	200	61-0122	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C5	.1	200	61-0113	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C6	665	500	30-1220-66							
C7	.05	200	6-0122	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C8	.05	200	61-0122	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C9	1.5		30-1221-3	SI1.5NP0	TCZ-1.5		NP0K-1R5	ZT-5515	5TCCB-V15	
C10	47	500	60-00475420	1468-00005	D6-470	5W5Q5	GP1K-470		1FM-45	
C11	.1	200	61-0113	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C12	.003	600	45-3505-61	P688-003	D6-302	PTE6D3	GP2-333-302	PT623	6TM-D3	
C13	100		62-110009001	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C14A	.001		BPD-001	BPD-001	DD-102	TM5D1	801-001	DC-521		
B	200		30-1237	SI200	D6-201	TM5T2	GP2K-201	UC-532		
C	.01		BPD-01	BPD-01	DD-103	TM5S1	821-01	DC-511		
D	.002		BPD-002	BPD-002	DD-202	TM5D2	801-002	DC-522		
C15	.004	600	61-0179	P688-004	D6-402	PTE6D4	GP2-333-402	PT624	6TM-D4	
C16	.047	400		489ZGXY-05		PJ4S47		PT4147	4TM-S47	Note 1

Note 1. Some Models use .04MFD in this application (Part #45-3500-2)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1 Meg	½	33-5566-11	Q13-137	AG-63-Z	B-70-S	U-53	Volume-Note
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-2	SWB-2	Not Req.	US-27	Attach to R1A

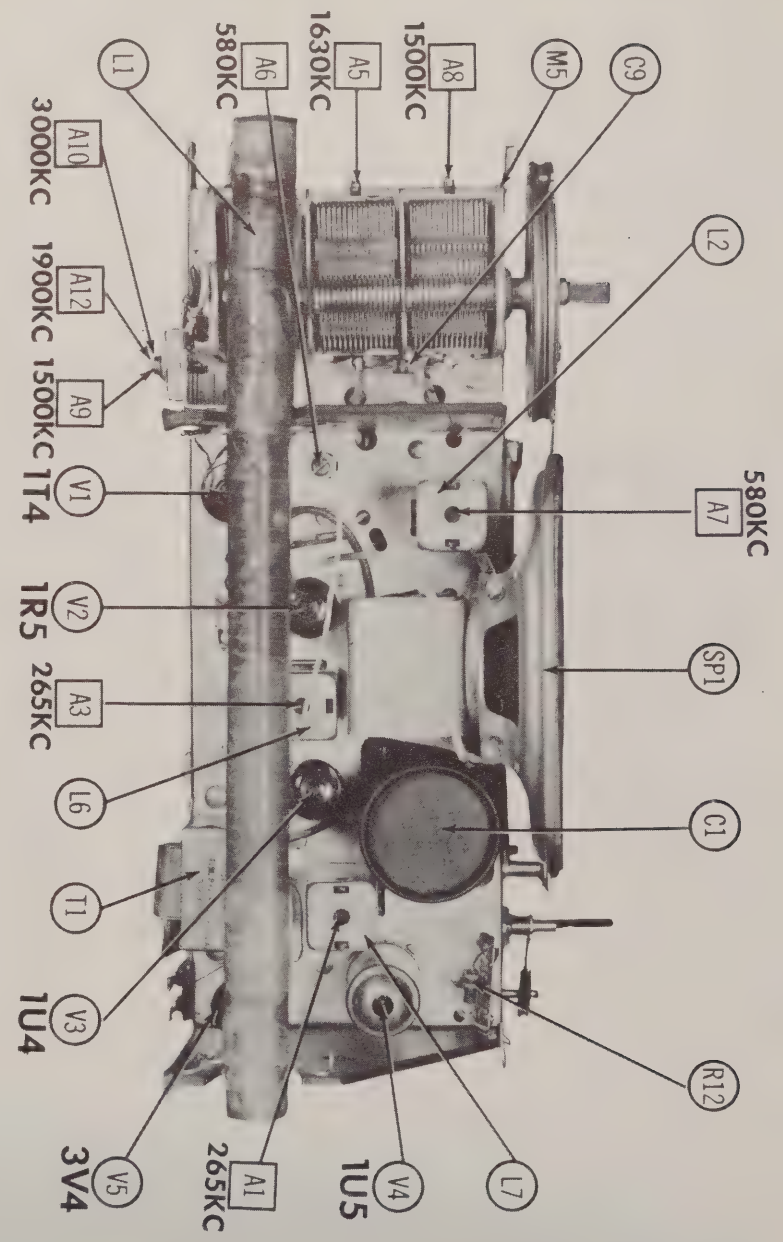
Note. Some models use alternate control (Part No. 45-5001-21).

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PHILCO PART No.	IRC PART No.	
R2	2.2Meg	½-⅓-¼-⅛	66-5228340	BTS -2.2Meg	
R3	100Ω	½-⅓-¼-⅛	66-1108340	BTS-100	
R4	4.7Meg	½-⅓-¼-⅛	66-5478340	BTS-4.7Meg	
R5	150KΩ	½-⅓-¼-⅛	66-4158340	BTS-150K	
R6	100KΩ	½-⅓-¼-⅛	66-4108340	BTS-100K	
R7	1500Ω	½-⅓-¼-⅛	66-2158340	BTS-1500	
R8	82Ω	½-⅓-¼-⅛	66-0828340	BTS-82	
R9	220Ω	½-⅓-¼-⅛	66-1228340	BTS-220	
R10	4.7Meg	½-⅓-¼-⅛	66-5478340	BTS-4.7Meg	
R11	15KΩ	½-⅓-¼-⅛	66-3158340	BTS-15K	
R12	4.7Meg	½-⅓-¼-⅛	66-5478340	BTS-4.7Meg	
R13	2200Ω	½-⅓-¼-⅛	66-2228340	BTS-2200	
R14	100KΩ	½-⅓-¼-⅛	66-4108340	BTS-100K	
R15	4.7Meg	½-⅓-¼-⅛	66-5478340	BTS-4.7Meg	
R16	4.7Meg	½-½-½-½	66-5478340	BTS-4.7Meg	
R17	750KΩ	½-½-½-½			Note 1
R18	82Ω	½-½-½-½	66-0828340	BTS-82	
R19	3.3Meg	½-½-½-½		BTS-3.3Meg	Note 2
R20	3.3Meg	½-½-½-½		BTS-3.3Meg	Note 3
R21	330Ω	2	66-1338340	BTS-330	
R22	120Ω	2	33-1334-14	BW-2-120	
R23A	950Ω	10	33-34-3431-7		
B	950Ω				
R24	1000Ω	½-½-½-½	66-2108340	BTS-1000	
R25	15KΩ	½-½-½-½	66-3158340	BTS-15K	Note 3
R26	15Ω	½-½-½-½	66-0153546		Note 3
R27	330Ω	½-⅓-¼-⅛	66-1338440	BTS-330	Note 3

Note 1. Some models use a 680KΩ resistor in this application.
Note 2. Some models use a 2.2Meg resistor in this application.
Note 3. Not used in all models.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		PHILCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T1	9KΩ	3.4Ω	320Ω	.4Ω	32-8528	A-3329	A-2927 ①	RO-16 ①	S-11X	① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
SP1	5"	PM	3.3Ω	36-1625	ST-105 ① Mod. P5-X	5A07	① Fabricate mounting bracket.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	PHILCO PART No.	MERIT PART No.	
L1	Loop Ant.	.1Ω	.8Ω	32-4565		Secondary tapped @ .4Ω
L2	SW & BC RF Coil	100Ω	4.6Ω	32-4399-6A		
L3	SW RF Coil	2.4Ω				
L4	BC Osc. Coil	2.6Ω	6Ω	32-4263-6		
L5	SW Osc. Coil	6.5Ω		32-4562		
L6	Input IF	42Ω	37Ω	32-4160-2A	BC-350	
L7	Output IF	37Ω	37Ω	32-4240-6A	BC-354	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT	PHILCO PART No.	SYLVANIA PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	
M1	.068A	348003	NB5	5M4	1003	6S75	

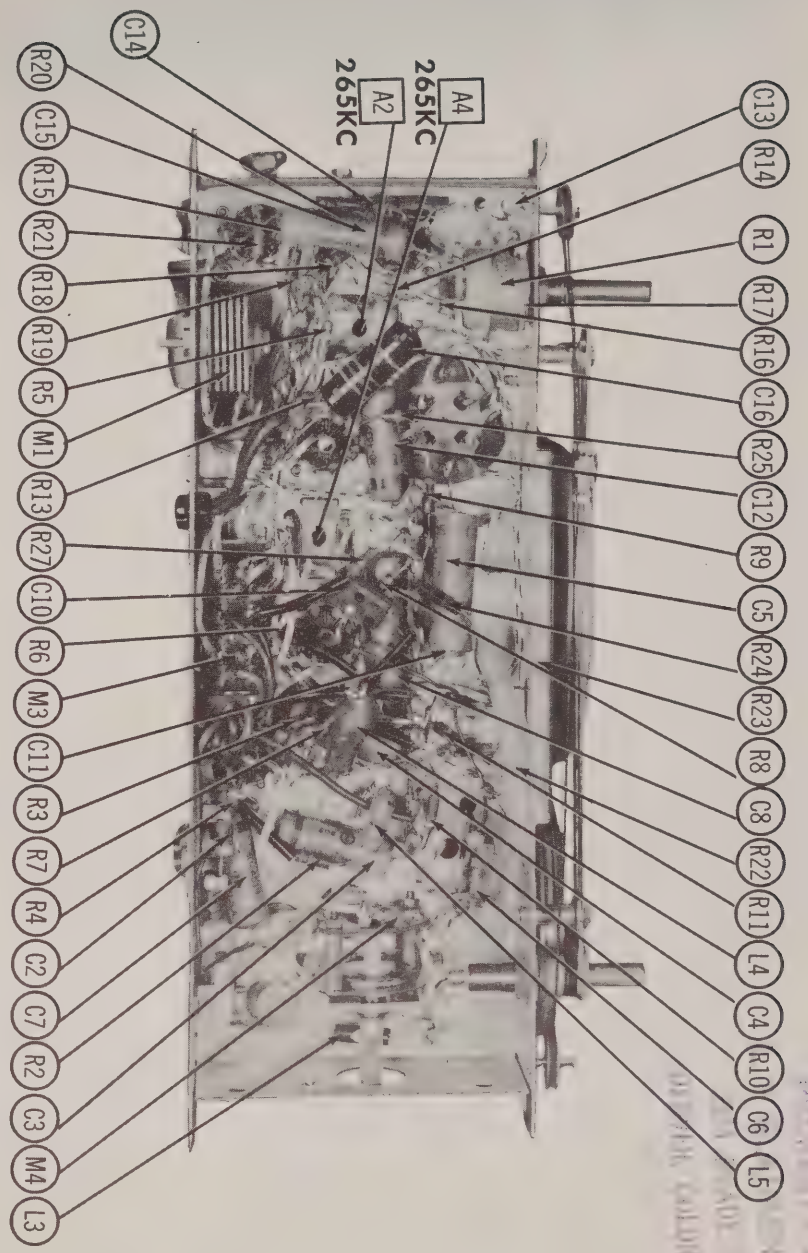
BATTERIES

ITEM No.	VOLTAGE	PHILCO PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	9V. & 90V.	P-274			756			T6Z60	

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M3	Switch	42-1899	Power Change-over
M4	Switch	42-1986	Standard Broadcast & Short-Wave
M5	Tuning Capacitor	31-2748-5	4-480MMF / 4-480MMF / 4-480MMF (3 Section)
	Trimmer	31-6476-27	High Frequency RF Trimmer
	Trimmer	31-6477-16	Antenna Trimmer (3 Section)
	Cabinet	10883-4	Molded Plastic (Light Beige) Model 53-656
	Cabinet	10919	Covered, Wooden Model 53-658
	Back	54-4903	Model 53-656
	Handle Assembly	76-7719	Model 53-656
	Handle Assembly	76-7681	Model 53-658
	Knob	54-4773-1	Tuning and Off/on Volume Model 53-656
	Knob	54-4816-1	Band Switch Model 53-656
	Knob	54-4527-36	Tuning and Off/on Volume Model 53-658
	Knob	54-4816-5	Band Switch Model 53-658
	Dial -Backplate Assy.	76-7720	Models 53-656, 53-658
	Scale	54-5148	Model 53-656
	Scale	54-5149	Model 53-658

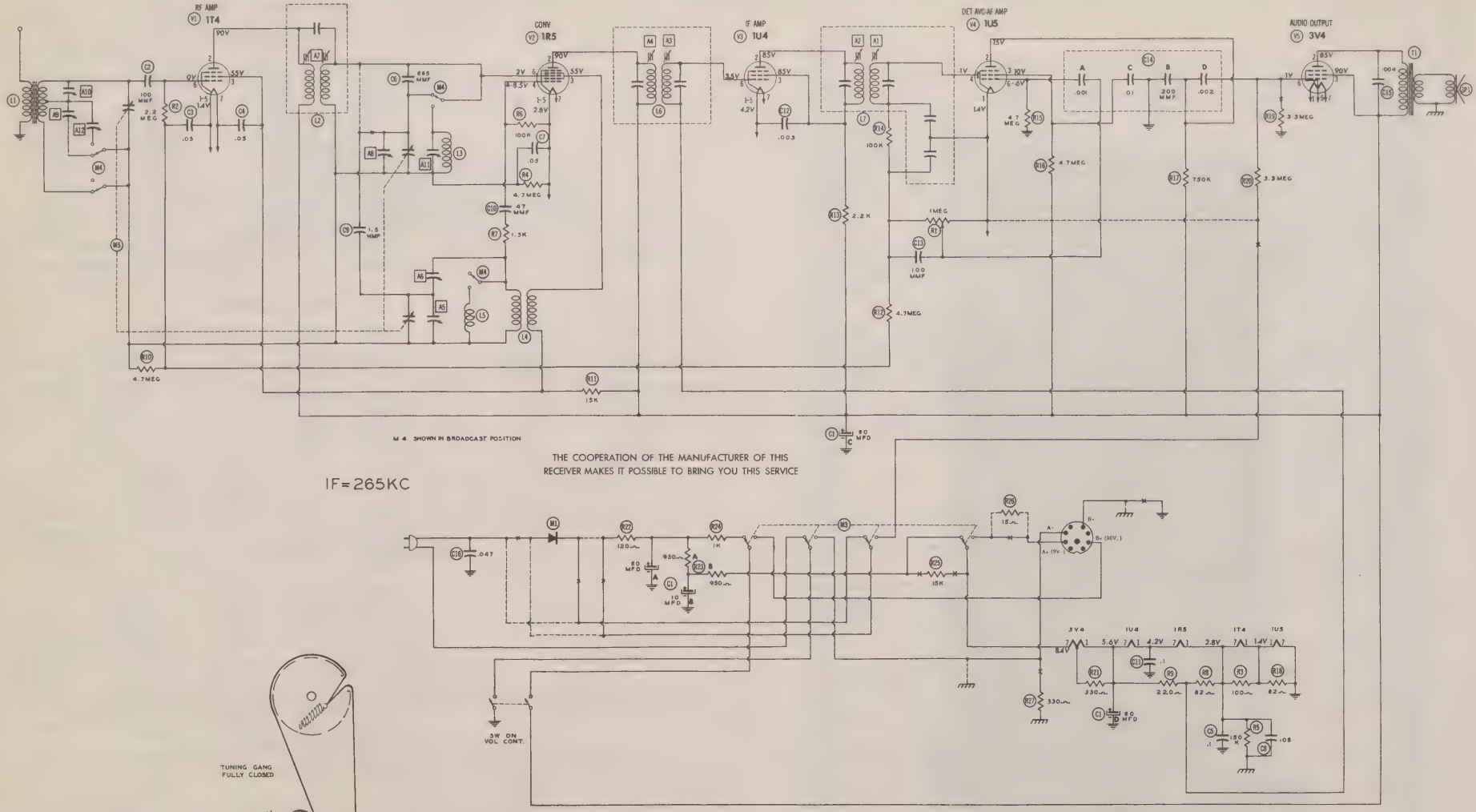
CHASSIS—BOTTOM VIEW

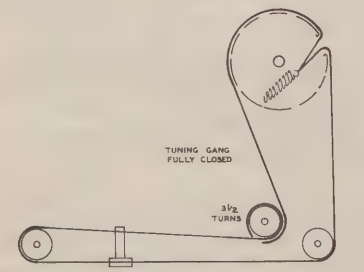


SET 187 FOLDER 10

PHILCO MODEL 53-656

PHILCO MODEL 53-656





DIAL CORD DRIVE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1T4	*	†1.1KΩ	†16KΩ	INF	*	5.8Meg	*
V 2	1R5	*	†1.1KΩ	†16KΩ	100KΩ	*	3.6Meg	*
V 3	1U4	*	†3.3KΩ	†3.3KΩ	*	*	120Ω	*
V 4	1U5	*	†750KΩ	†4.7Meg	900KΩ	0Ω	4.7Meg	*
V 5	3V4	*	†1.4KΩ	†1.1KΩ	INF	*	3.3Meg	*

READINGS TAKEN WITH POWER CHANGE-OVER SWITCH IN "AC" POSITION
BAND SWITCH IN " STANDARD BROADCAST" POSITION
† MEASURED FROM OUTPUT OF M1
* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE
▲ TAKEN WITH VACUUM TUBE VOLTMETER

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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187-10

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

*TRADE MARK

SYLVANIA MODELS 150A, L, 155A, L, M (Ch. 1-437-3) (Codes C06 and up)

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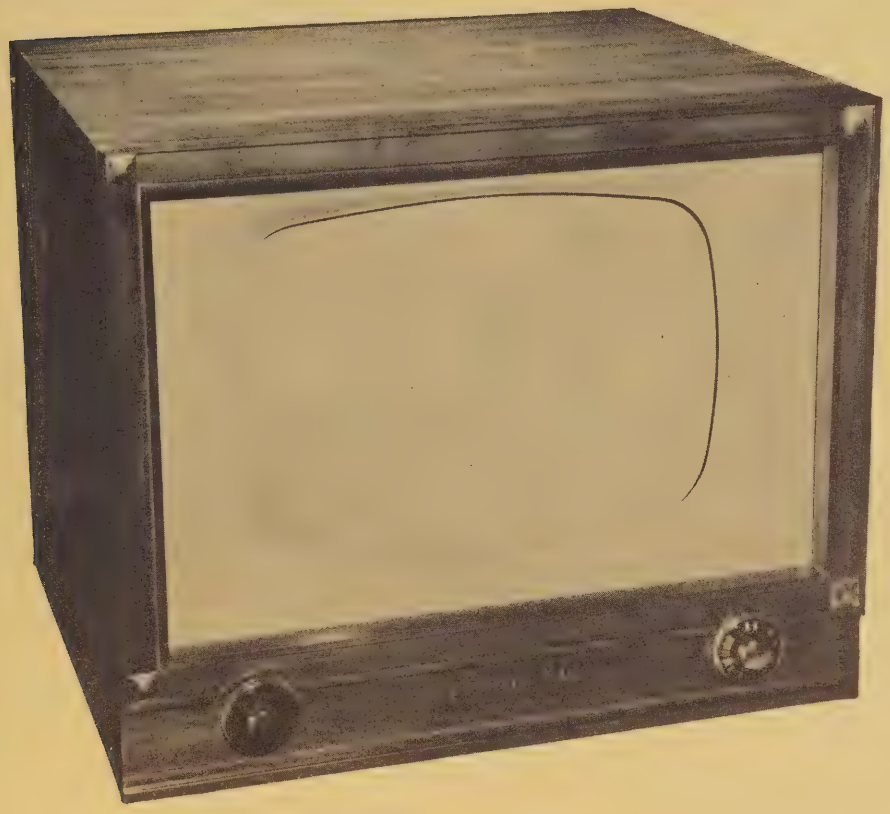
Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



MODEL 155M

SYLVANIA MODELS 150A, L, 155A, L, M (Ch. 1-437-3) (Codes C06 and up)

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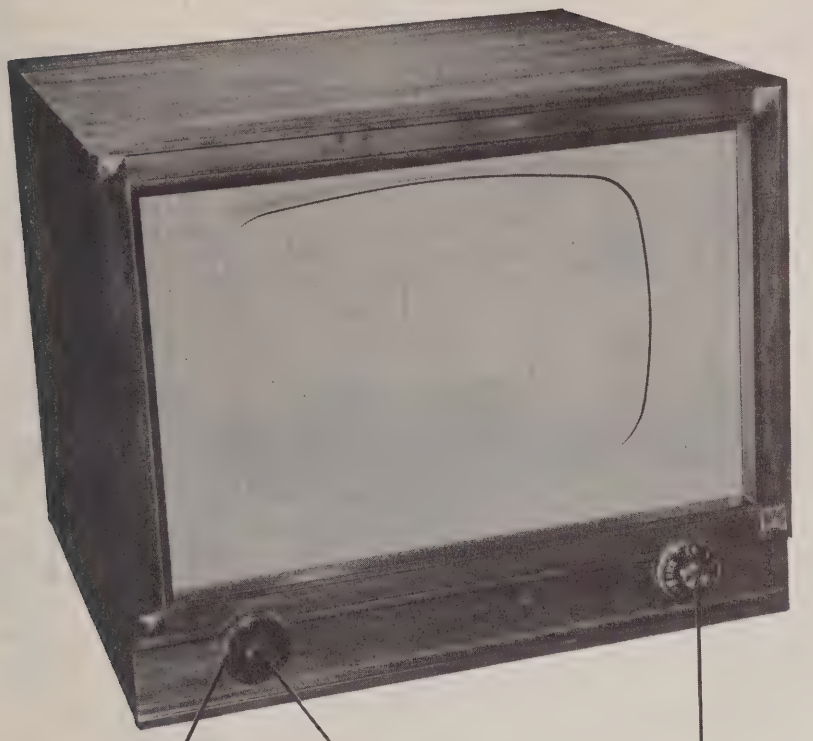
DATE 12-52 SET 187 FOLDER 11

PHOTOFACT* Folder

SYLVANIA MODELS 150A, L, 155A, L, M (Ch. 1-437-3) (Codes C06 and up)



SYLVANIA 155M

TRADE NAME	Sylvania Models 150A, 150L, 155A, 155L, 155M (Ch. 1-437-3) Code C06 and up.
MANUFACTURER	Sylvania Electric Products Inc., Radio & Tel. Div., 254 Rano St., Buffalo, New York.
TYPE SET	Television Receiver
TUBES	Twenty-Five
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 2.1 Amp. @ 117 Volts AC
TUNING RANGE—	Channels 2 thru 13 (Continuous Tuning)

INDEX

Alignment Instructions 6, 7
Disassembly Instructions 11
Horizontal Sweep Circuit Adjustments 13
Parts List and Descriptions 14, 15, 16
Photographs
- Cabinet-Rear View 11
- Capacitor and Alignment Identification 4, 9
- Chassis - Top View 3
- High Voltage Compartment 18
- Photographs (Con't)
- RF Tuner 10
- Resistor and Inductor Identification 12, 17

Resistance Measurements 8
Schematic 2
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

SYLVANIA MODELS 150A, L, 155A, L, M (Ch. 1-437-3) (Codes C06 and up)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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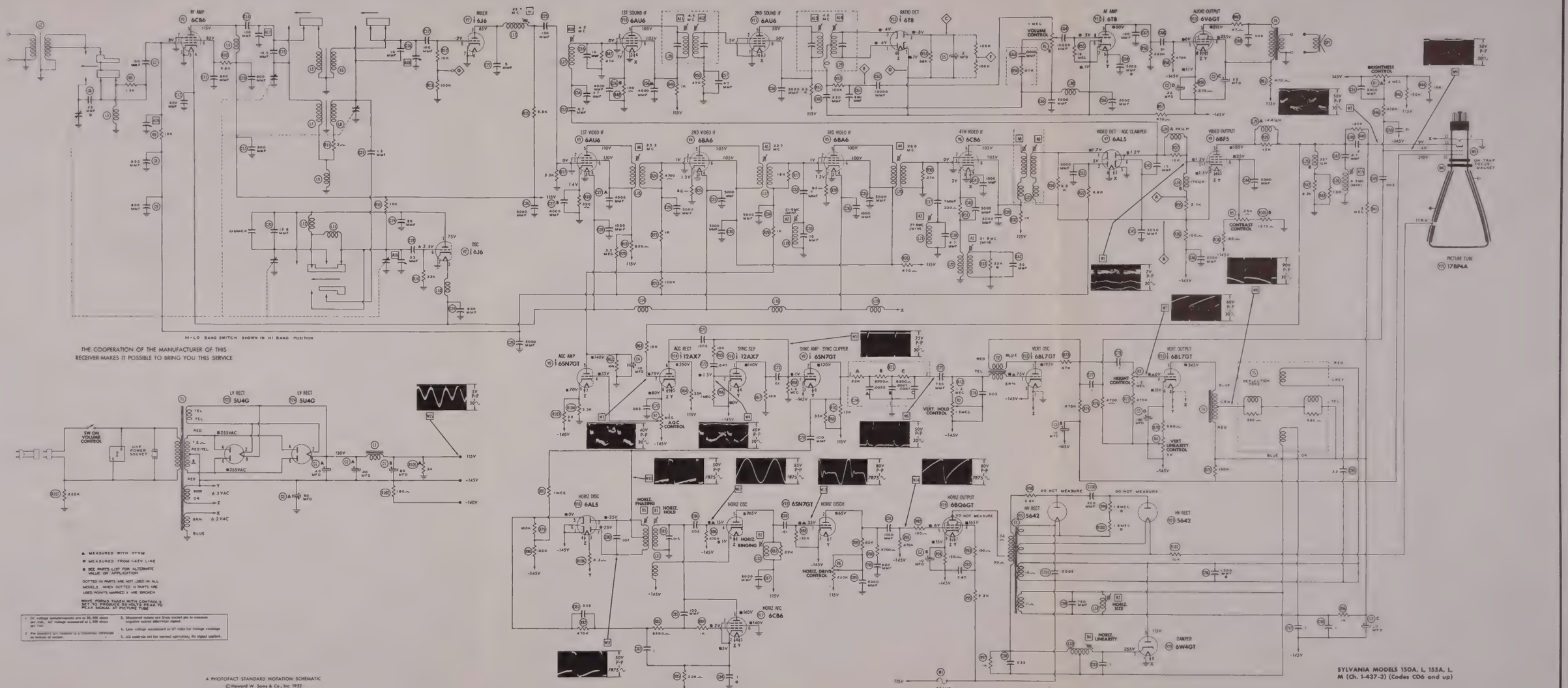
SYLVANIA MODELS 150A, L, 153A, L, M (Ch. 1-437-3) (Codes C06 and up)
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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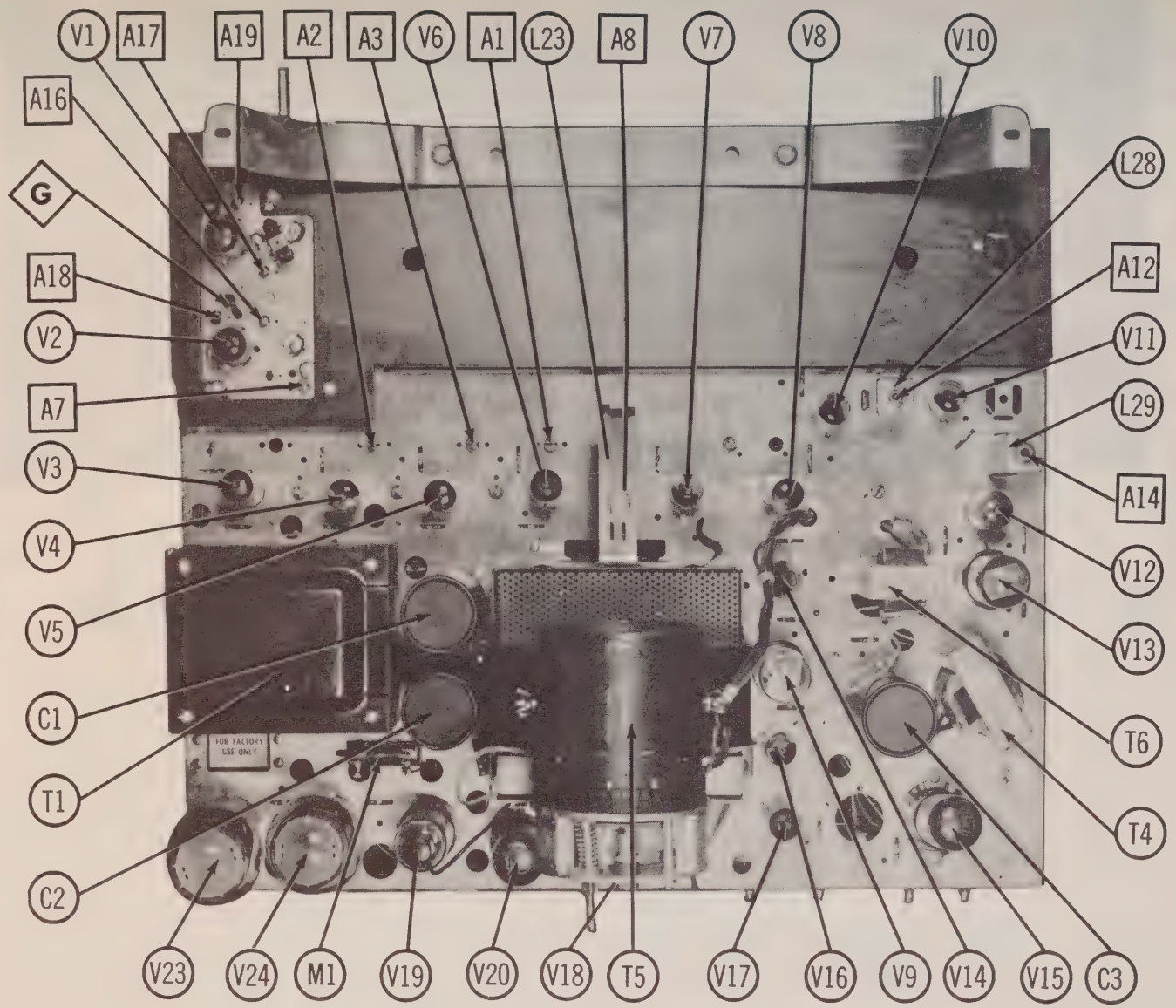
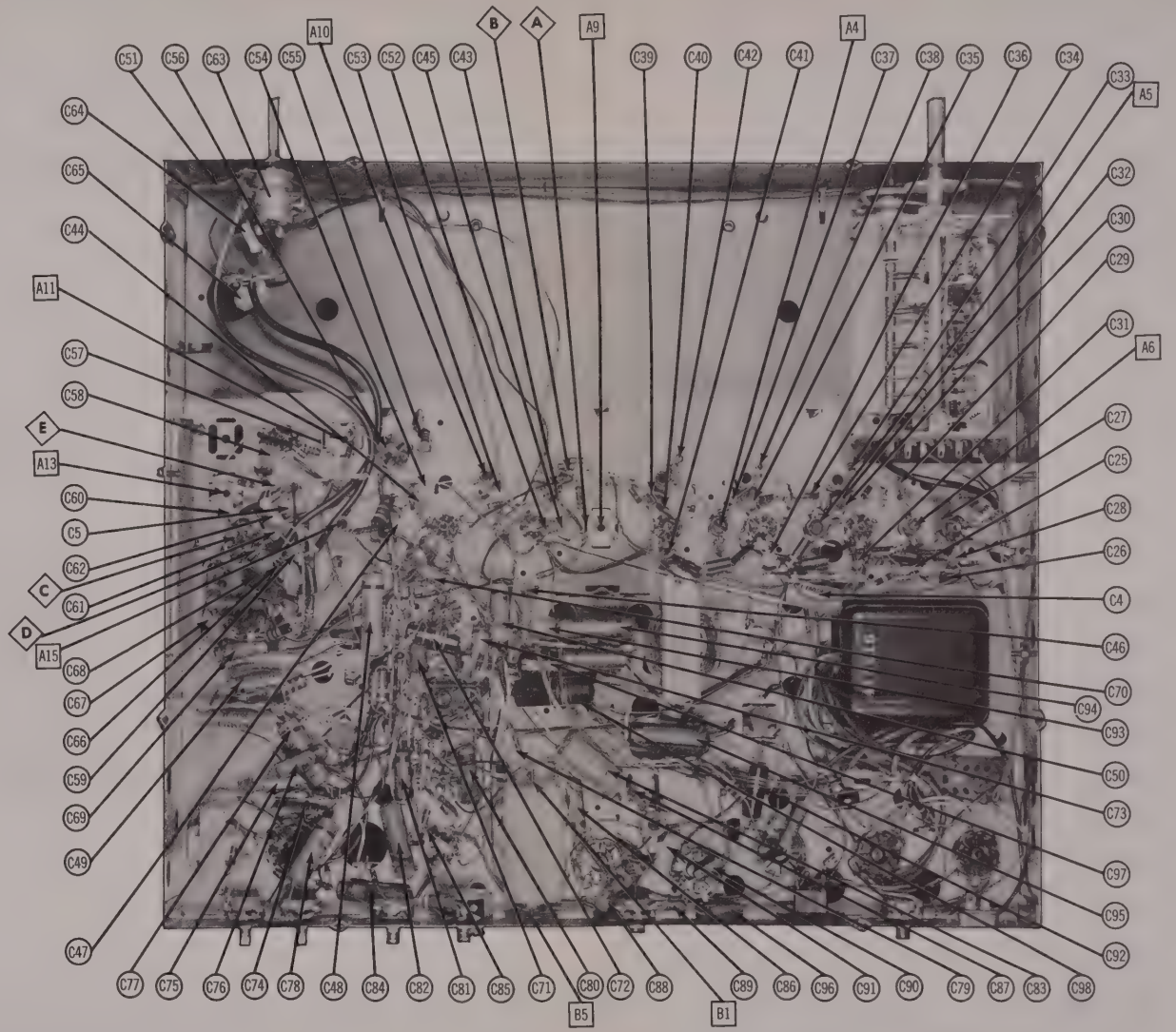
SYLVANIA MODELS 150A, L, 153A, L, M (Ch. 1-437-3) (Codes C06 and up)



CHASSIS TOP VIEW

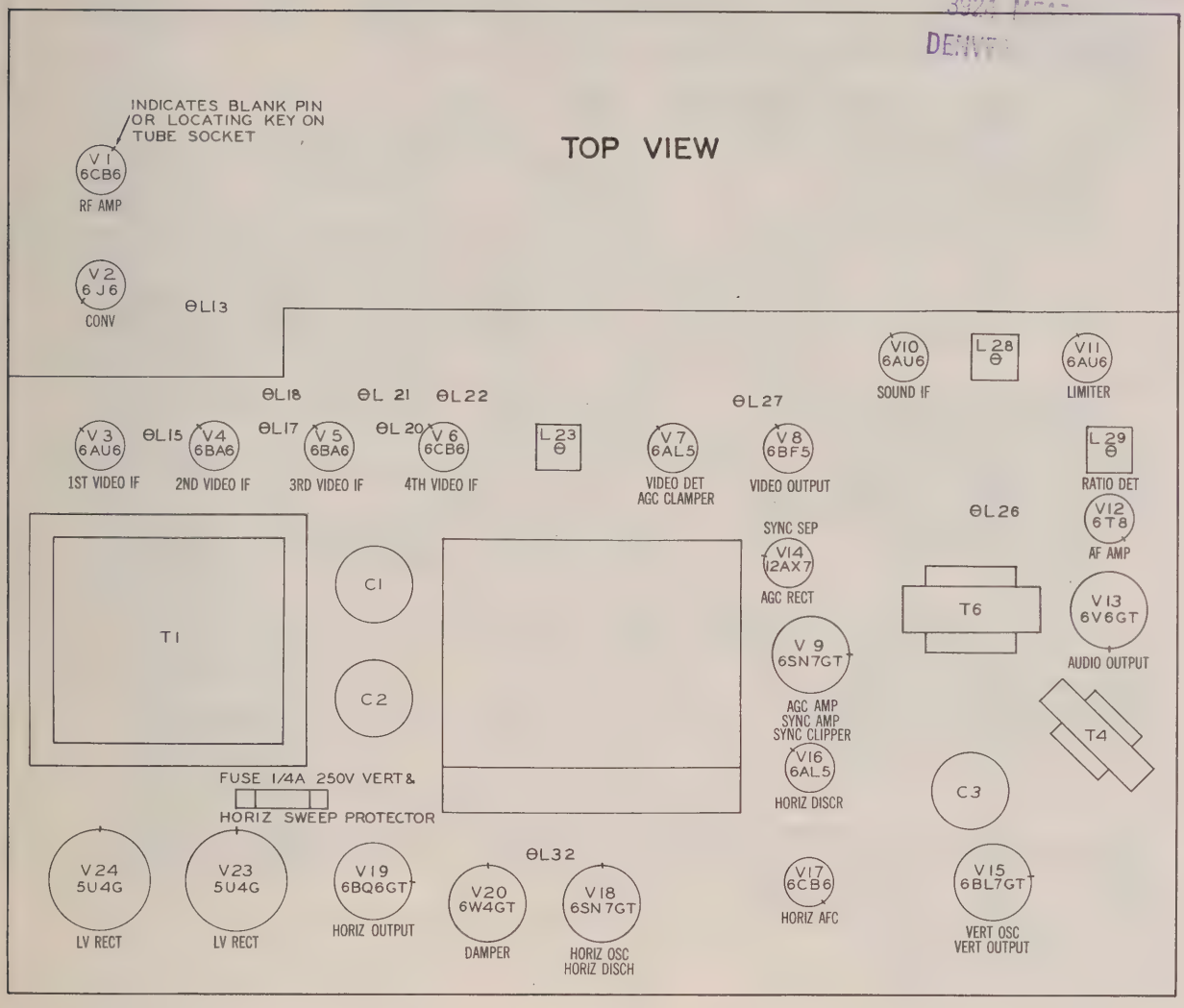
L BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART

PROPERTY OF
L. F. BLANKENSHIP
3924 MEAD
DENVER



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-V23, V24

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5, V6, V7
No pic, no sound, has snow-V1, V2, V3
No pic, has sound, has raster-V8, V25
Has pic, no sound-V10, V11, V12, V13,
Overloaded picture-V7, V9, V14

SYNC FAILURE
No vert. sync-V9, V15
No horiz. sync.-V9, V16, V17, V18,
No vert. or horiz. sync - V9, V14

SWEEP FAILURE
No raster, has sound-V18, V19, V20, V21, V22, V25, Fuse (M1)
No vertical deflection-V15
Poor vert. linearity or foldover-V15
Poor horiz. linearity or foldover-V18, V19, V20
Narrow picture-V18, V19, V20, V21, V22, V23, V24
Vert off freq.-V9, V15
Horiz. off freq.-V9, V16, V17, V18

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal oscillator tube (V18).

VIDEO IF ALIGNMENT

Remove the converter tube (V2), and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to the junction of R20 and R21. Connect the positive lead to chassis.
In Step 7, connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis	Not used.	21.9MC (Unmod.)	Any	USE VTVM DC probe to point (A) Common to point (B)	A1, A2	Caution: Point (B) is at approximately - 145 volts with respect to chassis. Avoid touching or grounding VTVM. Adjust A1 and A2 for MINIMUM deflection.
2	"	"	"	27.9MC	"	"	A3	Adjust for MINIMUM deflection.
3	"	"	"	26.0MC	"	"	A4	Adjust for maximum. deflection
4	"	"	"	22.7MC	"	"	A5	"
5	"	"	"	25.5MC	"	"	A6	"
6	"	"	"	23.5MC	"	"	A7	Adjust for maximum. deflection. Repeat steps 1 and 2.
7	.005MFD	High side to pin 1 (grid) of 6CB6 (V6). Low side to chassis	24MC (10MC Swp.)	23.0MC 27.0MC 21.9MC	"	Vert. amp. to point (A). Low side to chassis.	A8, A9	Adjust for response curve as in Fig. 1. (Both cores accessible from top of chassis)

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC	22.75MC 26.4MC	Any	Vert. amp. to point (A). Low side to chassis.		Check for response curve similar to Fig 2. If necessary, retouch A4 through A7 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (E) to point (D). The junction of these two resistors is alignment point (C) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.005MFD and 47KΩ in series	High side to pin 1 (Cathode) of 6AL5 (V7). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point (C). Common to point (D)	A10, A11, A12, A13	Adjust for maximum deflection. Keep generator output low to avoid limiting action at V11.
10.	"	"	"	"	DC probe to point (E). Common to point (D).	A14	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.005MFD	High side to pin 1 (Cathode) of 6AL5 (V7) Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (C). Low side to chassis.	A10, A11 A12, A13	Disconnect stabilizer capacitor C5. Adjust for curve of maximum amplitude and symmetry as in fig. 3.
10.	"	"	"	"	"	Vert. Amp. to point (E). Low side to chassis.	A14	Reconnect capacitor C5. Adjust so that 4.5MC occurs at center of crossover lines as in fig. 4. SLIGHTLY retouch A13 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	.005MFD	High side to pin 1 (grid) of 6BF5 (V8). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru detector (fig. 8) to pin 1 of picture tube. Common to chassis.	A15	Ground pin 1 of V8 to chassis. Adjust A15 for MINIMUM deflection.

TUNER ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
The use of two marker generators is required to align this tuner. Marker generator No. 1 is connected through a 2 or 3 MMF capacitor across the sweep generator at the antenna terminals. If the sweep generator has a built-in marker it will be used for marker No.1. The frequency to which marker No. 1 is tuned will be indicated in the table by an asterisk (*). Marker generator No. 2 is connected to an ungrounded tube shield slipped over the converter tube. The frequency to which marker No. 2 is tuned will be indicated in the table by a dagger (†).
During tuner alignment it is necessary to switch the oscilloscope between the detector circuit (Fig. 5) and the 10KΩ resistor connected to point (G). It is recommended that a single pole, double throw switch, mounted as closely as possible to the oscilloscope terminals be used to switch the oscilloscope input.
All connecting leads should be shielded and kept as short as possible.
The points where the oscillator alignment is made occur at the points where the cam connected to the tuning shaft just begins to actuate the slide band switch. Some mechanical overshoot may occur as the switch operates, and it will be necessary to back off the tuning control to the point of maximum or minimum capacity, whichever is desired.
Leave the 3 volt bias applied as under Video IF Alignment.
Remove the second Video IF Amplifier (V4) from its socket.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

LOW BAND OSCILLATOR ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	57MC (10MC Swp)	*56.75MC †21.9MC	Tuning gang fully closed (Slide switch to rear).	Vert. amp. thru detector (Fig. 5) to pin 1 (grid) of V3. Low side to chassis.	L9	Remove tuner bottom cover. With a non-metallic pick vary the turns spacing on L9 until the markers coincide on response curve as shown in fig. 6.
13.	"	"	85MC (10MC Swp)	*85.35MC †26.4MC	Tuning gang fully open (Slide switch to rear)	"	A18	Adjust until markers coincide as in Step 12. Repeat steps 12 and 13 until oscillator frequency is correct at both ends of Low band range.

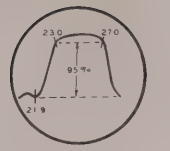


FIG. 1

FIG. 2

FIG. 3

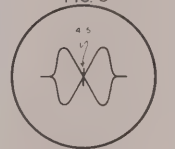


FIG. 4

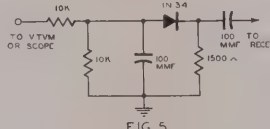


FIG. 5

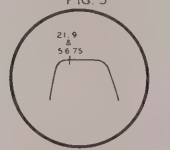


FIG 6

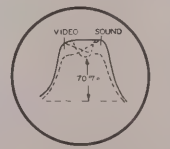


FIG. 7

ALIGNMENT INSTRUCTIONS (CONT.)

L. F. BLANK

HIGH BAND OSCILLATOR ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	177MC (10MC Swp)	*176.55MC †21.9MC	Tuning gang fully closed (Slide switch forward)	Vert. Amp. thru detector to pin 1 (grid) of V3. Low side to chassis	L10	With a non-metallic pick vary the turns spacing on L10 until the markers coincide on response curve as in Step 12.
15.	"		213MC (10MC Swp)	*215.75 MC †26.4MC	Tuning gang fully open (Slide switch forward)		C20	Adjust turns of wire around C20 until markers coincide as in Step 13. If necessary readjust L10 on Channel 7 for marker coincidence. Replace bottom cover of tuner. If markers separate make compromise adjustment of L10 so markers coincide with bottom cover in place. Repeat Steps 14 and 15 until oscillator frequency is correct at both ends of high band range. Recheck low band range.

LOW BAND RF ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	57MC (10MC Swp)	*59.75MC †21.9MC	2	Vert. amp. thru detector to pin 1 (grid) of V3. Low side to chassis.		Turn tuning control until markers coincide on response curve.
17.	"	"	"	*55.25MC *59.75MC	"	Vert. amp. thru 10KΩ to point (A). Low side to chassis.	L6, L7	Remove tuner bottom cover. Check for response curve within the limits of fig. 7. If adjustment is necessary connect 150Ω across R9 and adjust both sections of L6 for desired response. Adjust turns of L7 until bandpass is slightly wider than necessary to maintain markers at peaks of response curve.
18.	"	"	85MC (10MC Swp)	*87.75MC †21.9MC	6	Vert. amp. thru detector to pin 1 of V3. Low side to chassis.		Turn tuning control until markers coincide on response curve.
19.	"	"	"	*83.25MC *87.75MC	"	Vert. amp. thru 10KΩ to point (A). Low side to chassis.	A17, A18	Adjust for response curve within limits of fig. 7. Recheck Channel 2 and readjust L6 and L7 if necessary. Remove the 150Ω resistor from R9.
20.	"	"	57MC (10MC Swp)	*55.25MC *59.75MC	2	"	L2	Adjust turn spacing of L2 secondary until peaks of response are equal and a slight change causes peaks to rock evenly.
21.	"	"	85MC (10MC Swp)	*83.25MC *87.75MC	6	"	A19	Adjust for equal peaks. If A19 is adjusted recheck L2 in step 20 and readjust if necessary.

HIGH BAND RF ALIGNMENT

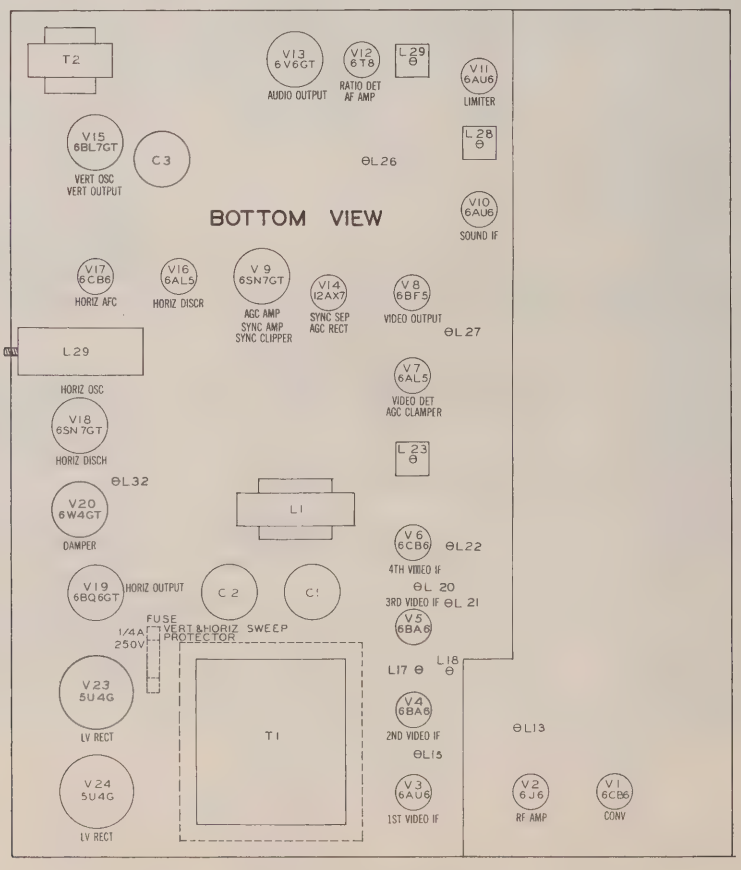
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
22.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	177MC (10MC Swp)	*179.75MC †21.9MC	7	Vert. amp. thru detector to pin 1 of V3. Low side to chassis.		Turn tuning control until markers coincide on response curve.
23.	"	"		*175.25MC *179.75MC		Vert. amp. thru 10KΩ to point (A). Low side to chassis.	L5	Check for response similar to fig. 7. Connect 150Ω resistor across R9 and adjust both sections of L5 by sliding the coils on or off the brass stud. L5 is properly adjusted when a slight change causes a shift of the response curve without noticeable change in bandwidth. Bandwidth is adjusted by altering the position of the L5 ground leads past the cutout in the shield partition and should be adjusted so response is slightly wider than necessary to keep markers at peaks of response.
24.	"	"	213MC (10MC Swp)	*215.75MC †21.9MC	13	Vert. amp. thru detector to pin 1 of V3. Low side to chassis.		Turn tuning control until markers coincide on response curve.
25.	"	"	"	*211.25MC *215.75MC		Vert. amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to fig. 7. If necessary make compromise adjustment of L5. Check all high band channels to see if further compromise adjustment of L5 is necessary to bring all high channels within limits of fig. 7.
26	Check response on Channel 7 and repeat adjustments, as in step 23, if necessary.							
27	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead	177MC (10MC Swp)	*175.25MC *179.75MC	7	Vert. Amp. through 10KΩ to point (A). Low side to chassis	L3	Remove 150Ω resistor from across R9. Adjust L3, turn spacing to the point where a slight variation will cause both peaks to rock slightly
28	"	"	213MC (10MC Swp)	*211.25MC *215.75MC	13	"		Check to see if channel 13 response is tilted beyond limits of Fig. 7. If necessary make compromise adjustment of L3 to limit tilt on channels 7 and 13. Replace tuner bottom cover and check response on channels 7 and 13, making con promise adjustments of L3 and L5, if necessary, for response as in Fig. 7.

SYLVANIA MODELS 150A, L, 155A, L, M (Ch. 1-437-3) (Codes C06 and up)

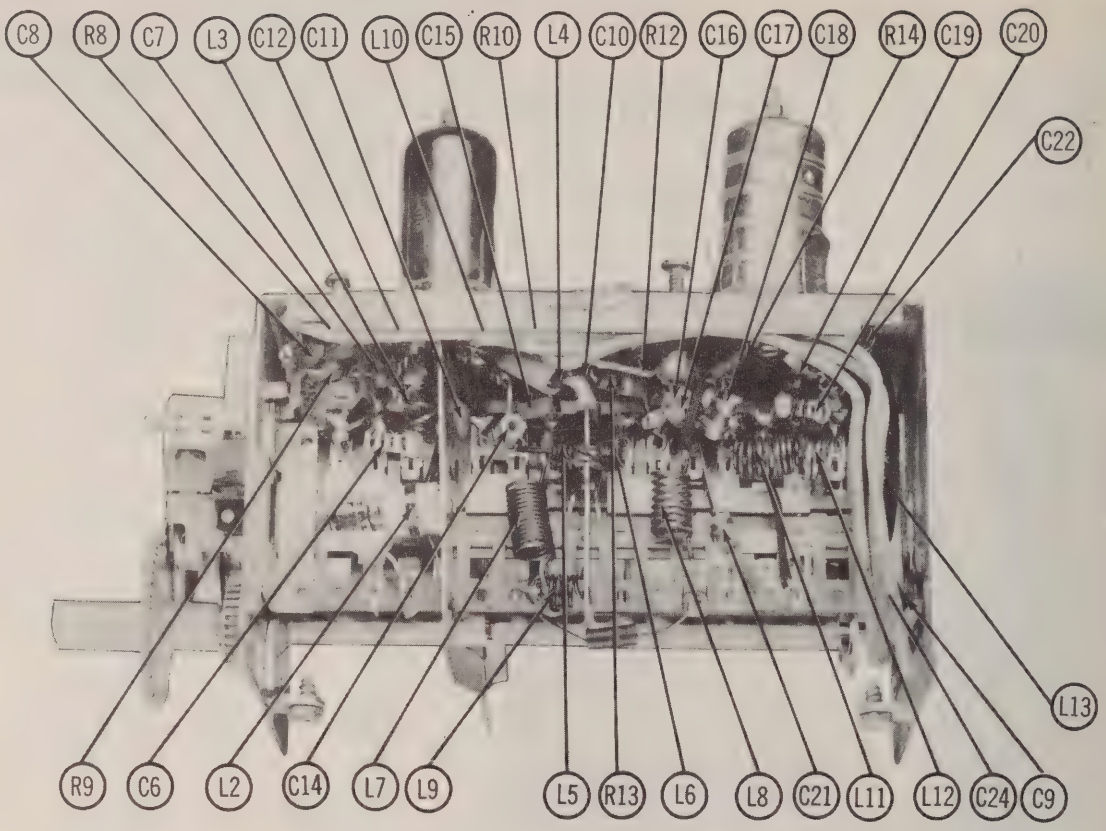
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	120KΩ	0Ω	0Ω	.1Ω	†39Ω	†6.8KΩ	0Ω		
V 2	6J6	†10KΩ	†6.8KΩ	.1Ω	0Ω	110KΩ	22KΩ	0Ω		
V 3	6AU6	3.3KΩ	0Ω	0Ω	.1Ω	†860Ω	†860Ω	220Ω		
V 4	6BA6	11K Ω	0Ω	0Ω	.1Ω	†510Ω	†510Ω	82Ω		
V 5	6BA6	11KΩ	0Ω	0Ω	.1Ω	†510Ω	†510Ω	82Ω		
V 6	6CB6	.4Ω	220Ω	0Ω	.1Ω	†1KΩ	†1KΩ	0Ω		
V 7	6AL5	■100Ω	130KΩ	.1Ω	0Ω	0Ω	■100Ω	■2.8KΩ		
V 8	6BF5	■2.8KΩ	■100Ω	■0Ω	■.1Ω	3.9KΩ	■280Ω	■2.8KΩ		
V 9	6SN7GT	1.2Meg	†10KΩ	■0Ω	■580KΩ	10KΩ	2KΩ	■.1Ω	■0Ω	
V 10	6AU6	47KΩ	0Ω	0Ω	.1Ω	†1KΩ	†1KΩ	100Ω		
V 11	6AU6	47KΩ	0Ω	.1Ω	0Ω	†22KΩ	†22KΩ	0Ω		
V 12	6T8	INF	■68KΩ	INF	■.1Ω	■0Ω	■470Ω	■470Ω	■15Meg	220KΩ
V 13	6V6GT	INF	■0Ω	†1.1KΩ	†510Ω	■470KΩ	†1KΩ	■.1Ω	■270Ω	
V 14	12AX7	12KΩ	■1 Meg	■0Ω	■0Ω	■0Ω	†33KΩ	14KΩ	■1Meg	■.1Ω
V 15	6BL7GT	■1.7Meg	#570KΩ	■0Ω	■1.1Meg	#1.9KΩ	■900Ω	■.1Ω	■0Ω	
V 16	6AL5	■0Ω	■1.1Meg	■1.8Ω	■.1Ω	■200KΩ	■0Ω	■1.1Meg		
V 17	6CB6	■680KΩ	■400Ω	■0Ω	■.1Ω	40Ω	0Ω	■400Ω		
V 18	6SN7GT	■150KΩ	†180KΩ	■0Ω	■470KΩ	†74Ω	■10Ω	■0Ω	■.1Ω	
V 19	6BQ6GT	†8.2KΩ	■.1Ω	INF	†8.3KΩ	■470KΩ	■470KΩ	■0Ω	■150Ω	Top Cap ■37Ω
V 20	6W4GT	■470KΩ	INF	850KΩ	†39Ω	†49Ω	†185KΩ	0Ω	.1Ω	
V 21	5642	Plate # INF	Fil. INF	Fil. INF						
V 22	5642	Plate #6.8KΩ	Fil. INF	Fil. INF						
V 23	5U4G	INF	2.9KΩ	INF	■7.2Ω	INF	■8Ω	■0Ω	2.9KΩ	
V 24	5U4G	INF	2.9KΩ	INF	■7.2Ω	INF	■8Ω	INF	2.9KΩ	
V 25	17BP4A	0Ω	■600KΩ	Pin 10 #100KΩ	Pin 11 180KΩ	Pin 12 .1Ω				

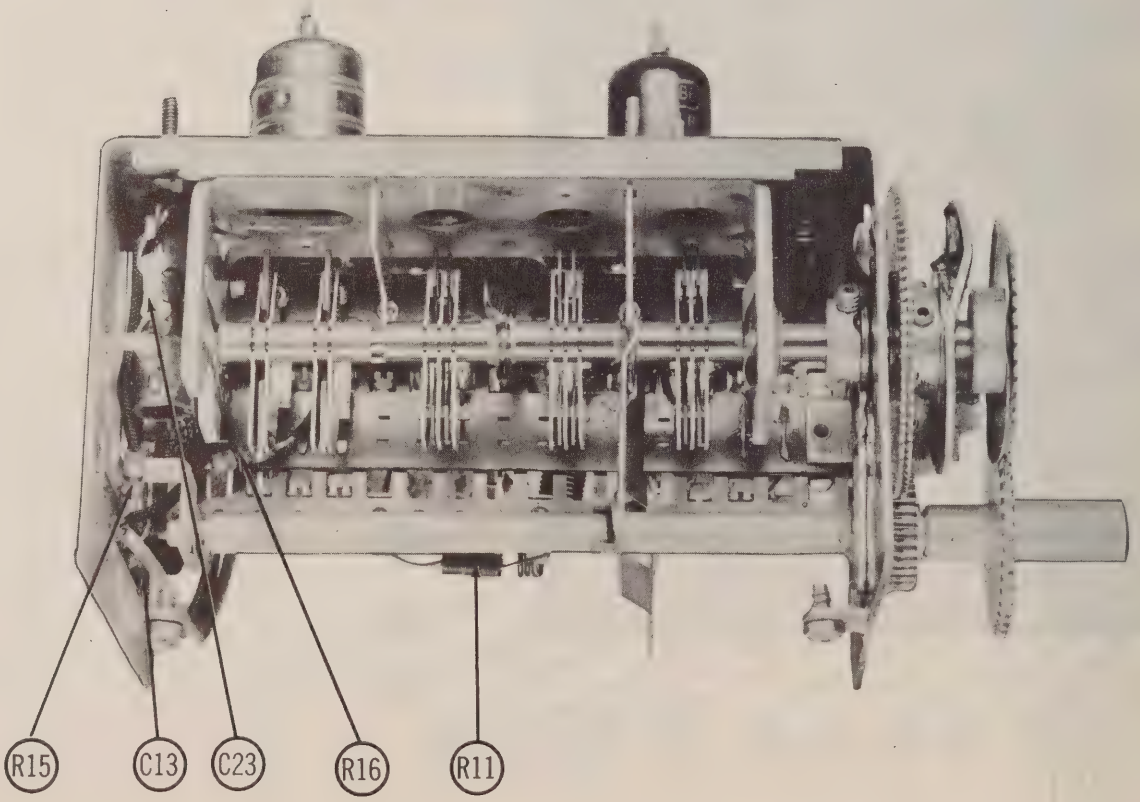
ALL CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED
† MEASURED FROM PINS 8 OF V23 & V24
# MEASURED FROM PIN 3 OF V20
■ MEASURED FROM -145VDC LINE



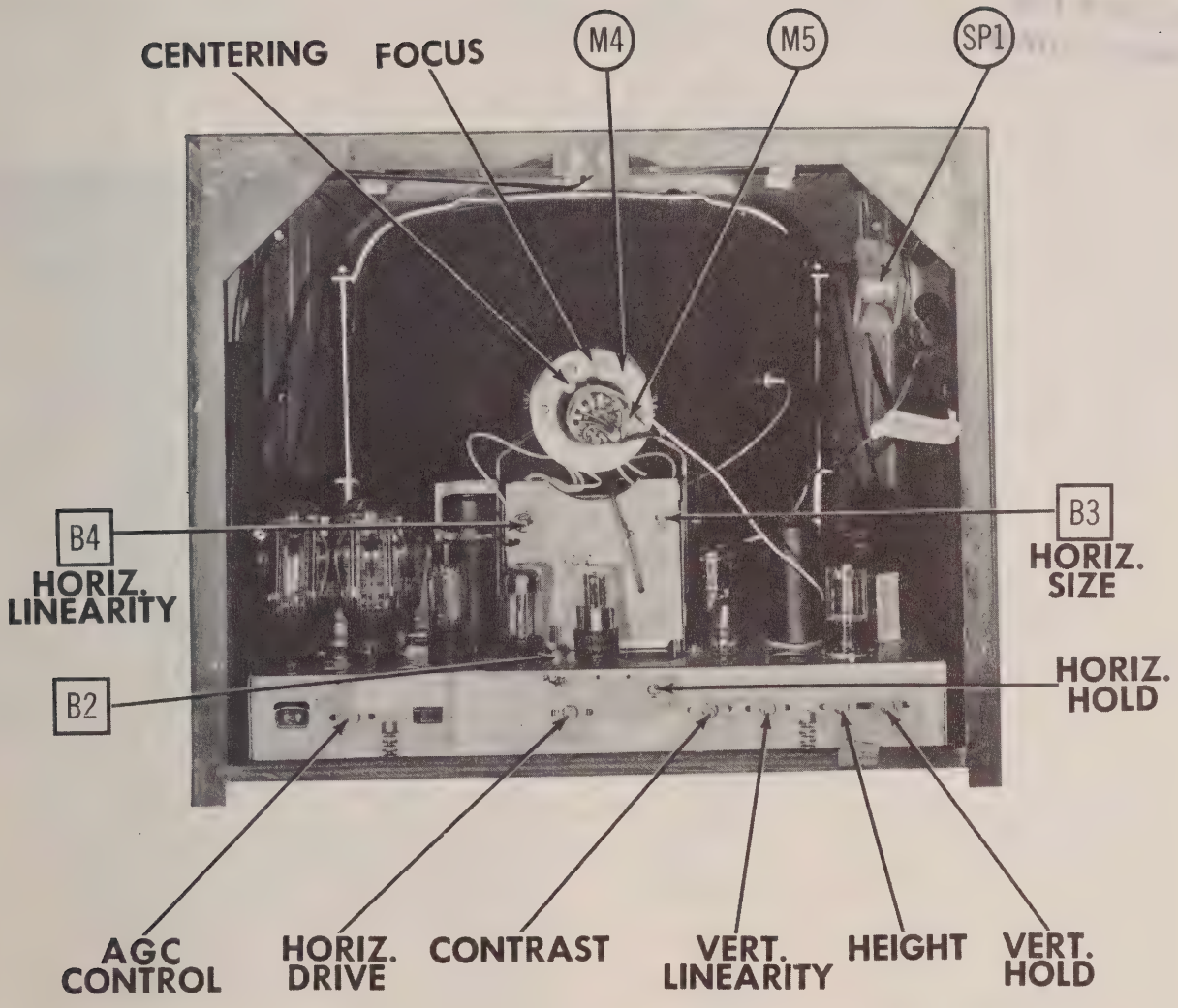
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



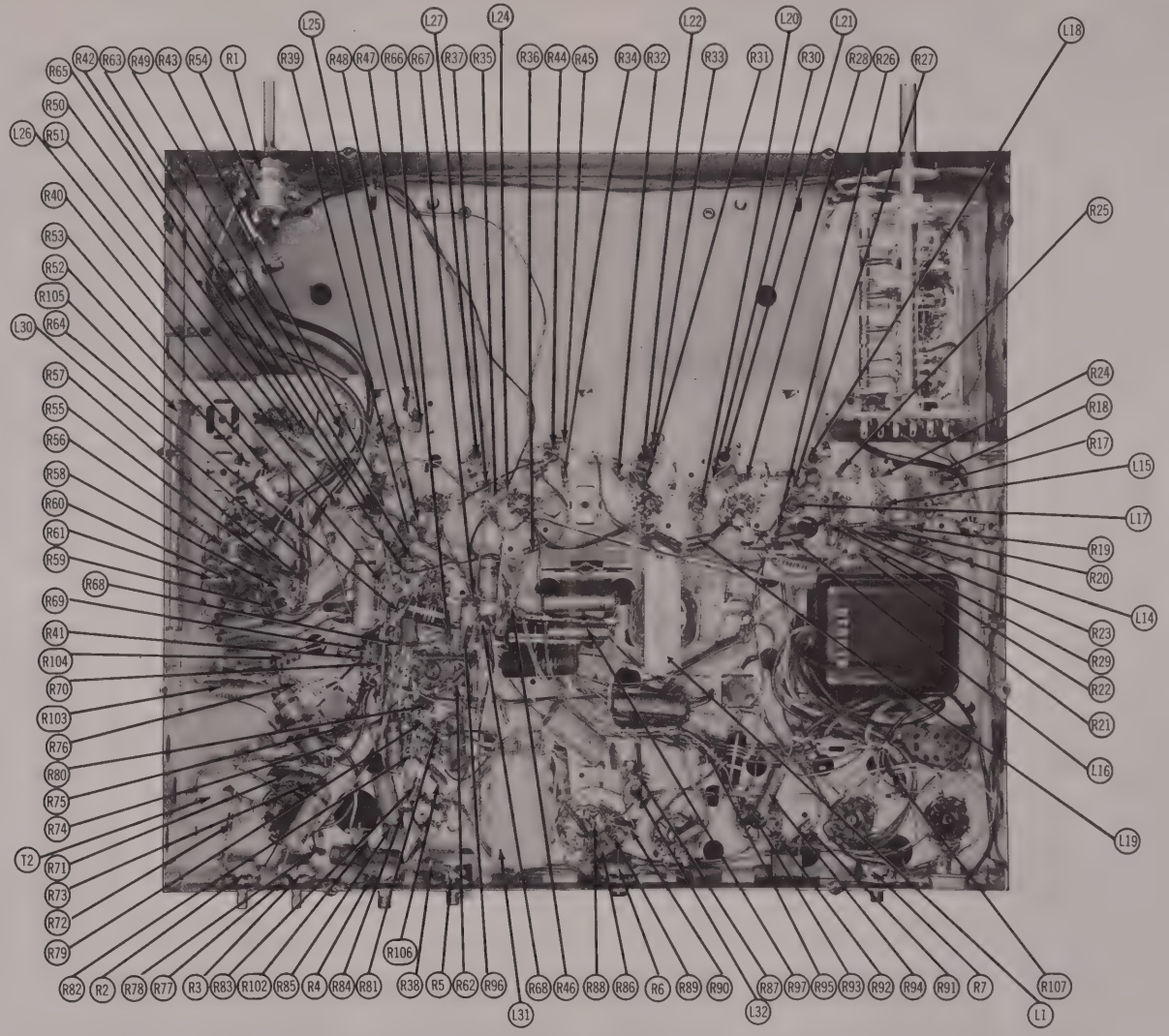
CABINET-REAR VIEW

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push on type control knobs from front panel.
2. Remove 4 wood screws. Remove rear cover.
3. Disconnect built in antenna & speaker.
4. Remove 2 speaker nuts. Remove speaker.
5. Remove 2 wood screws. Remove antenna bracket.
6. Remove 6 chassis bolts. Remove chassis.

NOTE: FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE CHASSIS AS OUTLINED ABOVE.

PROPERTY OF
L. F. E. ANKENBRANDT
3801 MEADE
DENVER



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern. Turn the horizontal hold adjustment to synchronize the picture.

Switch to another channel and back again. The picture should immediately fall into synchronization.

Turn the set off for five minutes and then back on.

The picture should immediately fall into sync.

Check the setting of the horizontal drive control as outlined under horizontal linearity adjustments.

Increase the brightness and decrease the contrast until the normally blanked edges of the raster are visible.

There should be approximately 1/8 inch of blanking visible at the right hand edge of the raster.

If receiver fails above tests proceed with Horizontal Hold adjustments.

HORIZONTAL HOLD ADJUSTMENTS

Tune in a station and adjust the tuning control for best picture quality.

Adjust the contrast and brightness controls for a normal picture.

Remove the horizontal discriminator tube (V16) from its socket. Turn the horizontal hold adjustment (B1) until the picture moves back and forth across the screen with the blanking bar vertical.

Replace V16 and repeat the horizontal oscillator check.

If receiver still fails the check, proceed with complete Horizontal Oscillator Alignment.

COMPLETE HORIZONTAL OSCILLATOR ALIGNMENT

Turn the core of the ringing coil (B2) fully counter clockwise. Short across R90.

Rotate the horizontal drive control fully counter clockwise.

Adjust the horizontal size slug (B3) and the horizontal linearity slug (B4) for correct picture width and best horizontal linearity.

Slowly turn the horizontal drive control clockwise until crowding of the center of the picture is noted, then counter clockwise just enough to remove the crowding. If no crowding is noted leave the control at maximum clockwise.

Remove V16 from its socket and adjust B1 until the picture moves back and forth across the screen with blanking bar vertical. Replace V16.

Reduce the contrast and increase the brightness until the blanking bar is visible. Adjust the horizontal phasing slug (B5) until approximately 1/8 inch of blanking is visible at right hand edge of picture.

Check adjustment of B1 as above and repeat adjustments of B1 and B5, if necessary, until both are correct.

Remove the short from R90. Readjust the horizontal drive control if necessary.

Adjust B2 clockwise until approximately 1/8 inch of blanking is again visible at right hand edge of picture.

Turn B1 in either direction until picture falls out of sync, then turn slowly in other direction, noting the least number of bars just before picture falls into sync. The number of bars should be not less than three, or more than six.

Remove V16 and adjust B1 until picture moves back and forth across the screen with blanking bar vertical. Replace V16.

Repeat oscillator check and repeat complete horizontal oscillator alignment if necessary.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No	USE	REPLACEMENT DATA: SYLVANIA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amplifier	6CB6	6CB6	7CM	
V2	Converter	6J6	6J6	7BF	
V3	1st Video IF Amp.	6AU6	6AU6	7BK	
V4	2nd Video IF Amp.	6BA6	6BA6	7BK	
V5	3rd Video IF Amp.	6BA6	6BA6	7BK	
V6	4th Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Detector - ACC Clamper	6AL5	6AL5	6BT	
V8	Video Output	6BF5	6BF5	7BZ	
V9	AGC Amplifier - Sync Amplifier - Sync Clipper	6SN7GT	6SN7GT	8BD	
V10	Sound IF Amp.	6AU6	6AU6	7BK	
V11	Limiter	6AU6	6AU6	7BK	
V12	Ratio Detector - AF Amplifier	6T8	6T8	9E	
V13	Audio Output	6V6GT	6V6GT	7AC	
V14	Sync Seperater - ACC Rectifier	12AX7	12AX7	9A	
V15	Vert. Oscillator - Vert. Output	6BL7GT	6BL7GT	8BD	
V16	Horiz. Disc.	6AL5	6AL5	6BT	
V17	Horiz. AFC	6CB6	6CB6	7CM	
V18	Horiz. Oscillator - Horiz. Discharge	6SN7GT	6SN7GT	8BD	
V19	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V20	Damper	6W4GT	6W4GT	4CC	
V21	HV Rectifier	5642	5642	5642	
V22	HV Rectifier	5642	5642	5642	
V23	LV Rectifier	5U4C	5U4G	5T	
V24	LV Rectifier	5U4C	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: SYLVANIA PART No.	REPLACEMENT DATA: SYLVANIA PART No.	RTMA BASE TYPE	NOTES
V25	17BP4A	17BP4A 17BP4 † 17BP4 ‡ 17RP4 ‡	12D 12D 12C 12C	† Circuit Changes Necessary

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	SYLVANIA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	±40	350	161-2003	AFH2-54		UPT44445		FP377	TVL-2675	
B	±80	350								
C2A	±40	350	161-4003	AFH4-109		UPT424		FP431.4	TVL-4707	
B	±10	450								
C	±60	350								
D	25	25								
C3A	60	200	161-4003	AFH4-107		UPT41I		FP427.5	TVL-4713	
B	±10	450								
C	±10	450								
D	±100	50								
C4	10	25	161-1000	PRS25/10		BR102A		TC32	TVA-1204	
C5	2	50	161-1001	PRS150/4		BBR-2-50T		TC302	TVA-1301	
C6	25									Note 1
C7	100			SI100	DS-101	TMST1	GP1K-101	UC-531	5GA-T1	
C8	800			BPD-0008	DD-801	TMST8	801-001	DC-521	5HK-D1	
C9	800			BPD-0008	DD-801	TMST8	801-001	DC-521	5HK-D1	
C10	800			BPD-0008	DD-801	TMST8	801-001	DC-521	5HK-D1	
C11	800			BPD-0008	DD-801	TMST8	801-001	DC-521	5HK-D1	
C12	800			BPD-0008	DD-801	TMST8	801-001	DC-521	5HK-D1	
C13	800			BPD-0008	DD-801	TMST8	801-001	DC-521	5HK-D1	
C14	100			SI100	DS-101	TMST1	GP1K-101	UC-531	5GA-T1	
C15	10.5									
C16	10			SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C17	100			SI100	DS-101	TMST1	GP1K-101	UC-531	5GA-T1	
C18	33									
C19	59									
C20	12.8									
C21	1.5			SI.5NP0	TCZ-1.5		NP0K-1R5	ZT-5515	5TCCB-V15	
C22	5						N330K-050			
C23	100			SI100	DS-101	TMST1	GP1K-101	UC-531	5GA-T1	
C24	800			BPD-0008	DD-801	TMST8	801-001	DC-521	5HK-D1	
C25	5000		168-5000D	BPD-005	DD-502	TMSD5	801-005	DC-525	5HK-D5	
C26	5000		168-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	
C27A	4000	‡	168-4003D	BPD-004	DD-602	TMSDD4	822-004	DCD-524	5HK-2D4	
B	4000	‡		BPD-004	DD-602					
C28	1000		168-1000P	BPD-001	DD-10 ‡	TMSD1	80L-001	DC-521	5HK-D1	
C29	5000		168-5000D	BPD-005	DD-502	TMSD5	81L-006	DC-525	5HK-D5	
C30	5000		168-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	
C31	5000		168-5000D	BPD-005	DD-503	TMSD5	81L-005	DC-525	5HK-D5	
C32	.7		168-0004P		TCZ-.68		NP0K-R68			
C33	10		168-0010P	SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C34	5000		168-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	
C35	5000		168-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	
C36	1000		168-1000P	BPD-001	DD-102	TMSD1	80L-001	DC-521	5HK-D1	
C37	.7		168-0004P		TCZ-.68		NP0K-R68			
C38	4.7		168-0008M	SI5NP0	TCZ-4.7		NP0K-4R7	ZT-555	5TCCB-V47	
C39	5000		168-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	
C40	5000		168-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	
C41	1000		168-1000P	BPD-001	DD-102	TMSD1	80L-001	DC-521	5HK-D1	
C42	50		168-0009M	SI50NP0			NP0-333-500		5TCC-Q5	
C43	10		168-0010P	SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C44	5000		168-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	SYLVANIA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C45	5000		168-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	
C46	5000		168-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	
C47	4.7			168-0008N	SI5NP0		NP0K-4R7	ZT-555	5TCC-B-V47	
C48	.2	200		162-0202	P488-22	PT4P22		TP429	2TM-P22	
C49	.003	600		162-0823	P688-003	PTE8D3	GP2-333-302	PT823	6TM-D3	
C50	.01	600		162-0613	P688-01	PTE8D1	GP2-333-103	PT811	6TM-S1	
C51	5000			166-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	
C52	5000			166-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	
C53	4.7			168-0008M	SI5NP0	TCZ-4.7		NP0K-4R7	ZT-555	5TCCB-V47	
C54	4.7			168-0008N	SI5NP0	TCZ-4.7		NP0K-4R7	ZT-555	5TCCB-V47	
C55	10			166-0010P	SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C56A	4000			166-0003D	BPD-004	DD-602	TMSDD4	822-004	DCD-524	5HK-2D4	
B	4000				BPD-004	DD-602				
C57	47			166-0047N	SI47	DS-470	TMSQ5	GP1K-470	UC-5447	5GA-G47	
C58	5000			166-5000D	BPD-005	DD-503	TMSD5	81L-005	DC-525	5HK-D5	
C59	5000			166-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	Note 3
C60	250			166-0250P	SIJ50		GP2K-251	UC-5325	5GA-T25	
C61	680		500	163-0680	1479-0007		GP5K-681	UC-5368	1FM-37	
C62	10000			168-0002N	BPD-01	DS-103	TMS81	GP2-333-103	DC-511	5HK-S1	
C63	10000			† 190-0006	BPD-01	DS-103	TMS81	GP2-333-103	DC-511	5HK-S1	
C64	10000			168-0002N	BPD-01	DS-103	TMS81	GP2-333-103	DC-511	5HK-S1	
C65	5000			166-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	
C66	5000			166-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	
C67	100		500	163-0100	1466-0001	DS-101	TMST1	GP1K-101	MC335	1FM-31	
C68	.01		600	162-0611	P688-01	DS-103	PTE8S1	GP2-333-103	PT611	6TM-S1	
C69	.005		600	162-0623	P688-005	DS-502	PTE8D5	GP2-333-502	PT625	6TM-D5	
C70	.003		600	162-0623	P688-003	DS-302	PTE8D3	GP2-333-302	PT623	6TM-D3	
C71	.005		600	162-0625	P688-005	DS-502	PTE8D5	GP2-333-502	PT625	6TM-D5	
C72	.047		200	160-02147	P488-47	DF-503	PTE4S47		PT447	4TM-S47	
C73	.01		600	162-0611	P688-01	DS-103	PTE8S1	GP2-333-103	PT611	6TM-S1	
C74A	.0022				P688-0022		PTE8D22		PT6222		
B	.0047				P688-0047	‡PC-100	PTE8D47	‡2605-01	PT6247	‡60C1	
C	.0047				P688-0047		PTE8D47		PT6247		
C75	750		500	163-0750	1464-00075						
C76	.003		600	162-0623	P688-003	DS-302	PTE8D3	GP2-333-303	PT623	6TM-D3	
C77	.1		400	160-0901	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C78	.1		400	160-0601	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C79	100		500	163-0100	1466-0001	DS-101	TMST1	GP1K-101	MC335	1FM-31	
C80	.005		600	162-0625	P688-005	DS-502	PTE8D5	GP2-333-502	PT625	6TM-D5	
C81	.005		600	162-0625	P688-005	DS-502	PTE8D5	GP2-333-502	PT625	6TM-D5	
C82	.1		200	160-0601	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C83	.015		400	160-0610	P688-015		PTE 8S15		PT615	6TM-S15	
C84	.1		200	160-0601	P288-1	DF-104	PJ2P1		PT401	2TM-P1	Note 3
C85	100		500	163-0100	1466-0001	DS-101	TMST1	GP1K-101	MC335	1FM-31	
C86	.002		400	162-04228	P688-002	DF-204	PTE8D2	GP2-333-202	PT822	6TM-D2	
C87	5000			166-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	
C88	.01		600	162-0 811	P688-01	DS-103	PTE8S1	GP2-333-103	PT611	6TM-S1	
C89	5000			166-5000D	BPD-005	DD-502	TMSD5	81L-005	DC-525	5HK-D5	
C90	680		500	163-0680	1479-0007					M8-37	
C91	1000			166-1000P	SI1000	DS-102	TMSD1	GP2L-102	UC-521	5HK-D1	
C92	.047		400	160-04147	P488-047	DF-503	PTE4S47		PT447	4TM-S47	
C93	.1		600	160-0601	P688-1		PTE8P1		PT601	6TM-P1	
C94	.033		600	162-0613	P688-033				PT6133		
C95	.22		200	160-02222	P488-22		PTE4P23		PT4P25	4TM-P22	
C96	1200		1500	174-1200A							Note 2
C97	.1		600	160-0601	P688-1	DF-104	PTE8P1		PT601	6TM-P1	
C98	.1		600	160-0601	P688-1	DF-104	PTE8P1		PT601	6TM-P1	
C99	750		1500	174-0750A		14878-HV-00075					
C100	500		10000	189-0014			TV1-501	MM-E10T5		30IC1	
C101	.0005		10000	160-14350		10084-0005		PTE10DT5		TVM-351	

Note 1. Some Models use 21.5MMF in this application.
Note 2. Some Models use 750MMF in this application.
Note 3. Not used in all Models
† Items C63 and R54 are combined in one unit.
• Items C74A, C74B, C74C, R71A, R71B, R71C are combined in one unit.

CONTROLS

ITEM No	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SYLVANIA PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: MALLORY PART No.	INSTALLATION NOTES
R1A	2 Meg	½	157-0009A	QJ-205 *	RTV-280	SBBT-694-S	UF26L UR16T254	Brightness-Panel Volume Tap, ⑥ 200K-Rear
B	1 Meg						US-28	Attach to R1B
C	Switch	½					US-28	Attach to R1B
R2A	1.5Meg	½	153-0014	Q11-138	AG-83-S	AB-75	SU-56	Vert. Hold
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R2A
R3A	1.5 Meg	½	153-0014	Q11-138	AG-83-S	AB-75	SU-56	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R3A
R4A	5000	½	153-0010	Q11-114	AG-19-S	AB-10	SU-14	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R4A
R5A	250Ω	2	153-0007	WK-250	A43-300	YK-123	R250L	Contrast-WireWound
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R5A
R6A	250KΩ	½	153-0007	Q11-130	AG-55-S	AB-50	SU-46	Horiz. Drive
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	1 Meg	½	153-0009	Q11-137	AG-81-S	AB-69	SU-54	AGC
B	Shaft		Not Req.	HQ	FKS-1/4	AK-1	Not Req.	Attach to R7A

* CONCENTRKIT EQUIVALENT KIT K-3, BASE ELEMENTS & SHAFTS Bil-139 & P)-220 (Panel)
Bi3-137X & R2-306 (Rear) & SWITCH 76-1.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: SYLVANIA PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R8	150Ω			BTS-1500	
R9	10KΩ			BTS-10K	
R10	680Ω				
R11	3Ω				
R12	10KΩ			BTS-10K	
R13	100KΩ			BTS 100K	
R14	22KΩ			BTS-22K	

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: SYLVANIA PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R15	680Ω			BTS-10K	
R16	10KΩ			BTS-3300	
R17	3300Ω		181-0333	BTS-220	
R18	220Ω		181-0221	BTS-820	
R19	820Ω		181-0821	BTS-3.3Meg	
R20	3.3Meg		181-0335	BTS-100K	
R21	100KΩ		181-0104		

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: SYLVANIA PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R22	6800Ω		181-0682	BTS-6800	
R23	1000Ω		181-0102	BTS-1000	
R24	4700Ω		181-0472	BTS-4700	
R25	82Ω		181-0820	BTS-82	
R26	470Ω		183-0471	BTA-470	
R27	33KΩ-5%		181-0335		
R28	82Ω		181-0820	BTS-82	
R29	1000Ω		181-0102	BTS-1000	
R30	27KΩ		181-0273		
R31	220Ω		181-0221	BTS-220	
R32	1000Ω		181-0102	BTS-1000	
R33	22KΩ		181-0223	BTS-22K	Note 1
R34	8200Ω		181-0822	BTS 8200	
R35	2700Ω-5%		181-02725	BTS-2700-5%	
R36	1000		181-0101	BTS-100	
R37	10KΩ		181-0103	BTS-10K	
R38	1 Meg		181-0105	BW 2-180	
R39	15KΩ		181-0153	BTS-15K	
R40	180K-5%		181-01845	BTS-180K-5%	
R41	1.2Meg 5%		181-01255	BTS-1.2Meg-5%	
R42	82000Ω	2	183-0822	BTB-8200	
R43	7500Ω-5%	2	183-07525	BTB-7500-5%	
R44	15KΩ		181-0153	BTS-15K	
R45	150KΩ		181-0154	BTS-150K	
R46	470KΩ		181-0474	BTS-470K	
R47	47KΩ		181-0473	BTS-47K	
R48	100Ω		181-0101	BTS-100	
R49	1000Ω		181-0102	BTS-1000	
R50	47KΩ		181-0473	BTS-47K	
R51	22KΩ		181-0223	BTS-22K	
R52	100KΩ		181-0104	BTS-100K	
R53	68KΩ		181-0683	BTS-68K	
R54	47KΩ		181-04731	BTS-47K	
R55	15Meg		181-0156	BTS-15Meg	
R56	220KΩ		181-0224	BTS-220K	
R57	470Ω		181-0471	BTS-470	
R58	470KΩ		181-0474	BTS-470K	
R59	270Ω	1	182-0271	BTA-270	
R60	47Ω		181-0470		
R61	470Ω	2	183-0471	BTB-470	
R62	10KΩ		181-0103	BTS-10K	
R63	10KΩ		181-0103	BTS-10K	
R64	33KΩ		181-0333	BTS-33K	
R65	10KΩ		181-0103	BTS-10K	
R66	1 Meg		181-0105	BTS-1 Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: SYLVANIA PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R67	12KΩ		181-0123	BTS-12K	
R68	1.2Meg		181-0125	BTS-1.2Meg	
R69	33KΩ	1	182-0333	BTA-33K	
R70	15KΩ	2	183-0153	BTB-15K	
R71A	22KΩ			BTS-22K	
B	8200Ω		‡190-0007	BTS 8200	
C	8200Ω			BTS-8200	
R72	1.2Meg		181-0125	BTS-1.2Meg	
R73	47KΩ		181-0473	BTS-47K	
R74	470KΩ		181-0474	BTS-470K	
R75	100KΩ		181-0104	BTS-100K	
R76	4700-5%		181-04725	BTS-4700-5%	
R77	470KΩ		181-0474	BTS-470K	
R78	68KΩ		181-0683	BTS-680	
R79	100KΩ		181-0104	BTS-100K	
R80	100KΩ		181-0105	BTS 100K	
R81	1 Meg		181-0005	BTS 1 Meg	
R82	470KΩ		181-0474	BTS 470K	
R83	8200Ω		181-3822	BTS-8200	
R84	1000Ω		181-0002		
R85	220Ω		181-0221	BTS-220	
R86	470KΩ		181-0474	BTS 470K	
R87	22KΩ		181-0223	BTS-22K	
R88	150KΩ		181-0154	BTS 150K	
R89	82KΩ		181-0823	BTS 82K	
R90	4700Ω		181-0472	BTS-4700	
R91	470KΩ		181-0474	BTS-470K	
R92	100Ω		181-0101		
R93	100Ω		181-0101		
R94	150Ω	2	183-0151	BTB-150	
R95	8300Ω	2	183-0832	BTB-8200	
R96	1000Ω		181-0102	BTS-1000	
R97	1000Ω	2	183-0103	BTB-1000	
R98	6800Ω		181-0682	BTS-6800	
R99	1.86Meg	2			Note 2
R100	1.8Meg	2			Note 2
R101	10KΩ		181-0103		
R102	180Ω-5%		181-01815	BTS-180-5%	
R103	38 000Ω	3	189-0023		
R104	3300Ω	2	BTB-3300	BTB-3300	
R105A	3000Ω				
B	12750Ω	14			
R106	4.3Ω	1	189-0007		
R107	220KΩ		181-0224	BTS-220K	

Note 1. Some models use a 33KΩ resistor in this application.
Note 2. Some models use a 1.5Meg resistor in this application.
† Items R54 & 63 are combined in one unit.
• Items R71A, R71B, R71C, C74A, C74B, C74C are combined in one unit.

TRANSFORMER (POWER)

ITEM No	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	SYLVANIA PART No	STANCOR PART No	MERIT PART No	CHICAGO PART No	TRIAD PART No
T1	117VAC ② 2.1A	512VCT .300ADC	5VAC ③ 6A	6.3VAC ④ 4.6A 6.3VAC ⑤ 4.6A	141-0013	P-8187 ①			

TRANSFORMER (SWEEP CIRCUITS)

ITEM No	RATING: PRI. RESISTANCE	RATING: SEC. RESISTANCE	SYLVANIA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No	NOTES
T2	145Ω	625Ω	242-0001	A-6141	A-3000	TBO-1 ‡	A-9 X 4	Vert. Osc. Trans.
T3	820Ω Tap ③ 30Ω	11Ω SEC. 2 10Ω SEC. 3 0Ω SEC. 4 0Ω	241-0006					Horiz. Output Trans.
T4	920Ω tap ④ 8.5Ω		241-0004	A-6143	A-3037	TSO-8 ③	A-102X	Vert. Output Trans.
T5A	10 Ω, 0Ω		100-0007					Horiz. Deflection Coils
B	50Ω							Vert. Deflection Coils

‡ Drill new mtg. holes
‡ Drill one new mtg. hole
① Tie brown & Blue leads together

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI	RATING: IMPEDANCE SEC.	RATING: DC RES PRI.	RATING: DC RES SEC.	SYLVANIA PART No	STANCOR PART No	MERIT PART No	CHICAGO PART No	TRIAD PART No	NOTES
T6	5.6KΩ	5.4Ω	535Ω	.75Ω	143-0021	A-3877	A-2930	RO-9 ‡	S-3X	‡ Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V C	RATINGS: IMP	SYLVANIA PART No	JENSEN PART No.	QUAM PART No	NOTES
SP1	6	PM	3.4.7		539-0601	ST-108 Mod. P6 X	6A	

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	SYLVANIA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.300ADC	39.5Ω	1.1 Hy.	145-0004	C-2326 ①	C-2996	TR-1733 ①	C-17X

① Drill one new mtg. hole.

COILS (RF-IF)

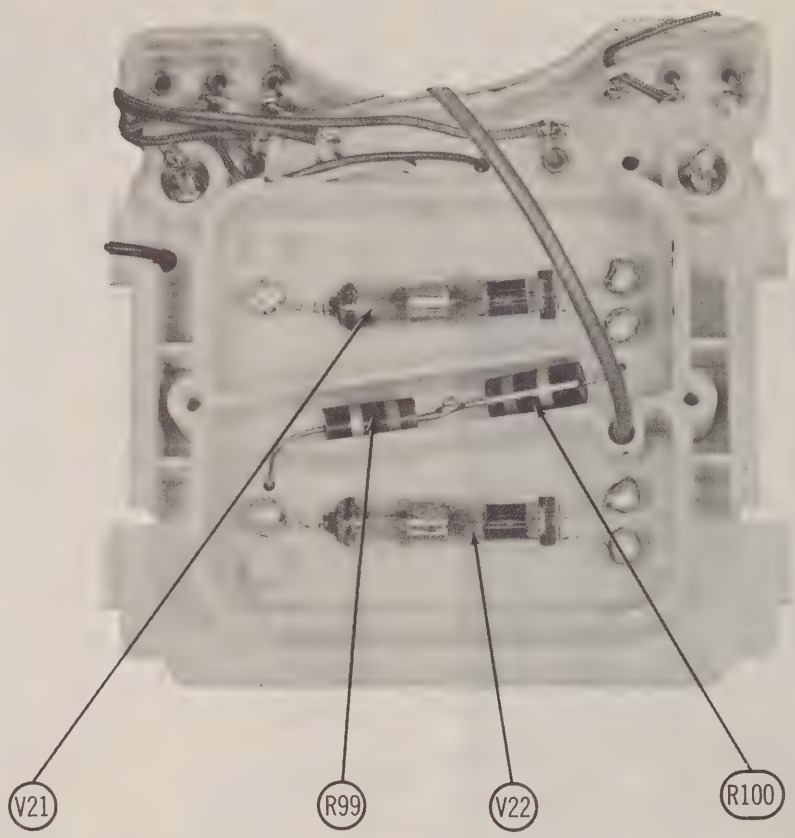
ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	SYLVANIA PART No.	MERIT PART No.	
L2	Ant. Trans	0Ω	0Ω			
L3	Ant. Coil	0Ω				
L4	RF Choke	.1Ω				
L5	RF Coil Pri.	0Ω				High Band
L6	RF Coil Sec.	0Ω				High Band
L7	RF Coil Pri.	0Ω				Low Band
L8	RF Coil Sec.	0Ω				Low Band
L9	RF Coil	0Ω				
L10	Fil. Choke	0Ω				
L11	Osc. Coil	0Ω				High Band
L12	Osc. Coil	0Ω				Low Band
L13	1st Video IF	1Ω			TV-103	
L14	Fil. Choke	0Ω		1470014		
L15	2nd Video IF	.4Ω	.4Ω	125002		
L16	Fil. Choke	0Ω		1470014		
L17	3rd Video IF	.4Ω	.4Ω	125002		
L18	21.9MC Trap	.2Ω		118-0007		
L19	Fil. Choke	0Ω		1470014		
L20	4th Video IF	.4Ω	.4Ω	125002		
L21	27.9 MC TRAP	.2Ω		118-007		
L22	Cathode TRAP	0Ω	.1Ω	118-0005		
L23	5th Video IF	.5Ω	1Ω	120-0002		
L24A	Series Peaking Coil	4.4Ω		131-2005	TV-180	46 Microhenries
B	Shunt Peaking Coil	5.5Ω			TV-184	174 Microhenries; Part of L24A
L25A	Series Peaking Coil	5.5Ω		131-2003	TV-184	144 Microhenries
B	Shunt Peaking Coil	7.8Ω			TV-185	257 Microhenries, Part of L25A
L26	4.5MC TRAP	6Ω		130-0001	TV-151	
L27	1st Sound IF	6Ω		130-0001	TV-151	
L28	2nd Sound IF	2.6Ω	2.6Ω	120-0001		
L29	Ratio Det.	12.5Ω	1.6Ω CT	128-0008	TV-110	Tertiary Winding - .8Ω
L30	RF Choke	0Ω		147-0014		
L31	Horiz. Osc. Coil	40Ω	90Ω	128-0006		Sec. -Tapped @ 45Ω Cathode Winding 10Ω
L32	Horiz. Ringing	35Ω		146-005	TV-163	
L33	Horiz. Lin.	7.5Ω		133-0001		Tapped @ 4.5Ω
L34	Width Coil	30Ω		132-0001	MWC-3	

FUSES

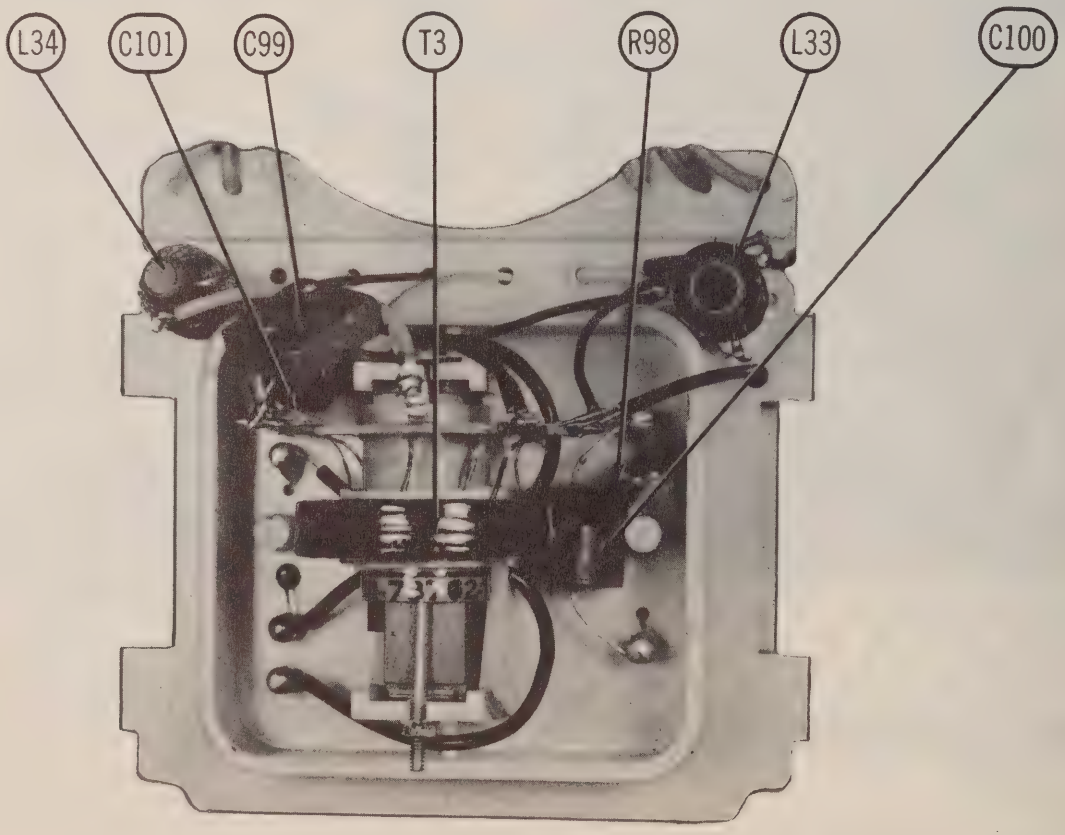
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			SYLVANIA PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	1/4A 250V	191-0005	487-0008	312.250	357001	AGC 1/4	4405

MISCELLANEOUS

ITEM No.	PART NAME	SYLVANIA PART No.	NOTES
M2	RF Tuner	323-0010	Complete with tubes.
M3	Switch	572-0001	Hi-Lo Ant. Models 150A and 150L
M4	Focus Magnet	400-0007	
M5	Ion Trap	400-0009	
	Knob	743-0017	
	Knob	744-0016	
	Knob	470-0028	
	Mask	716-0205	17" Rectangular tube (Models 155A, 155L and 155M).
	Mask and Gasket Assembly	716-0103	Model 150A
	Mask and Gasket Assembly	716-0203	Model 150L
	Safety Glass	710-0002	16/17" (Models 150A and 150L)
	Safety Glass	710-0008	Models 155A, 155L and 155M.
	Name Plate	818-0004	Models 155A, 155L and 155M.
	Name Plate	818-0001	Models 150A and 150L.
	Back Cover	760-0027	Includes Line Cord (Models 155A, 155L and 155M).
	Back Cover	560-0018	Includes Line Cord (Models 150A and 150L).



HIGH VOLTAGE COMPARTMENT - REAR VIEW

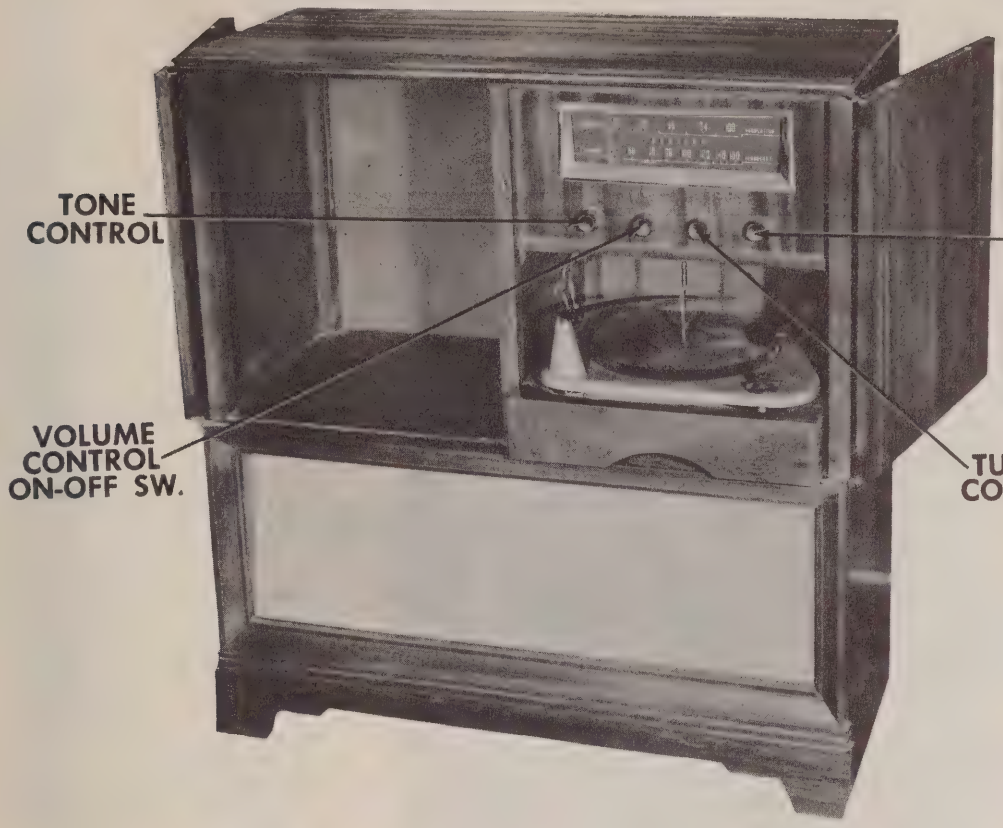


HIGH VOLTAGE COMPARTMENT - TOP VIEW

TRUETONE MODEL D1240A

PROPERTY OF
DENVER, COLORADO

TRUETONE
MODEL D1240A



TRUETONE
MODEL D1240A

TRADE NAME	Truetone Model D1240A
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	AC Operated Combination Phono-Radio, AM-FM Superheterodyne Receiver With 3 Speed Automatic Record Changer.
TUBES (Eight)	12AT7 FM RF Amp-Mixer, 6BE6 FM Osc. AM Conv., 6BA6 IF Amp., 6BA6 FM IF Amp., 6AL5 Disc., 6AV6 AM Det-AVC-AF Amp., 6V6GT Audio Output, 6X5GT Rect.
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING .37 Amp @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1600KC FREQ. MOD. 88-108MC

FOR SERVICE INFORMATION ON RECORD CHANGER SEE V-M MODEL 950, PHOTOFACT SET 107, FOLDER 13, OR RECORD CHANGER MANUAL CM-2, ALSO, SEE SUPPLEMENT PHOTOFACT SET 131, FOLDER 17.

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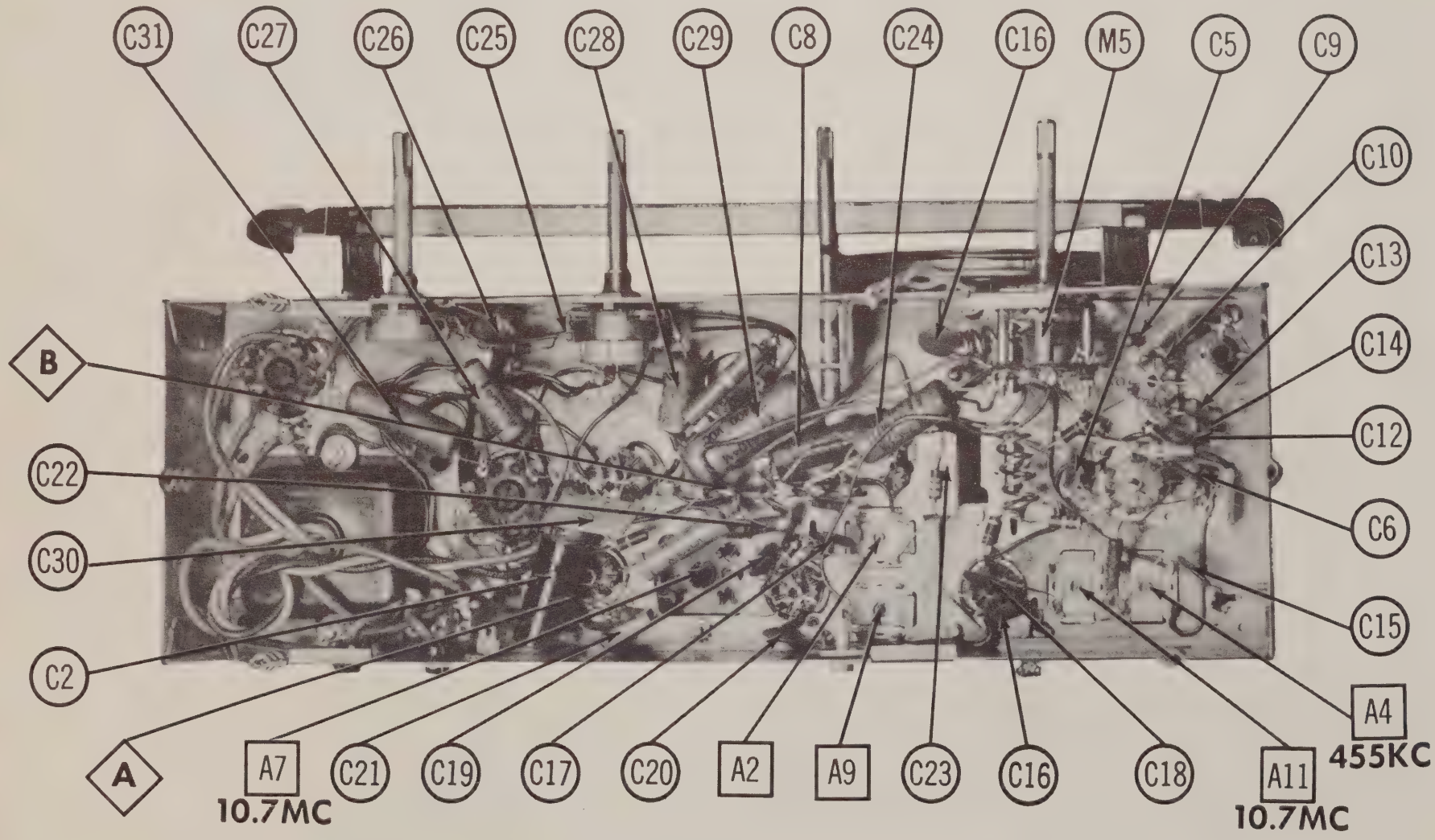
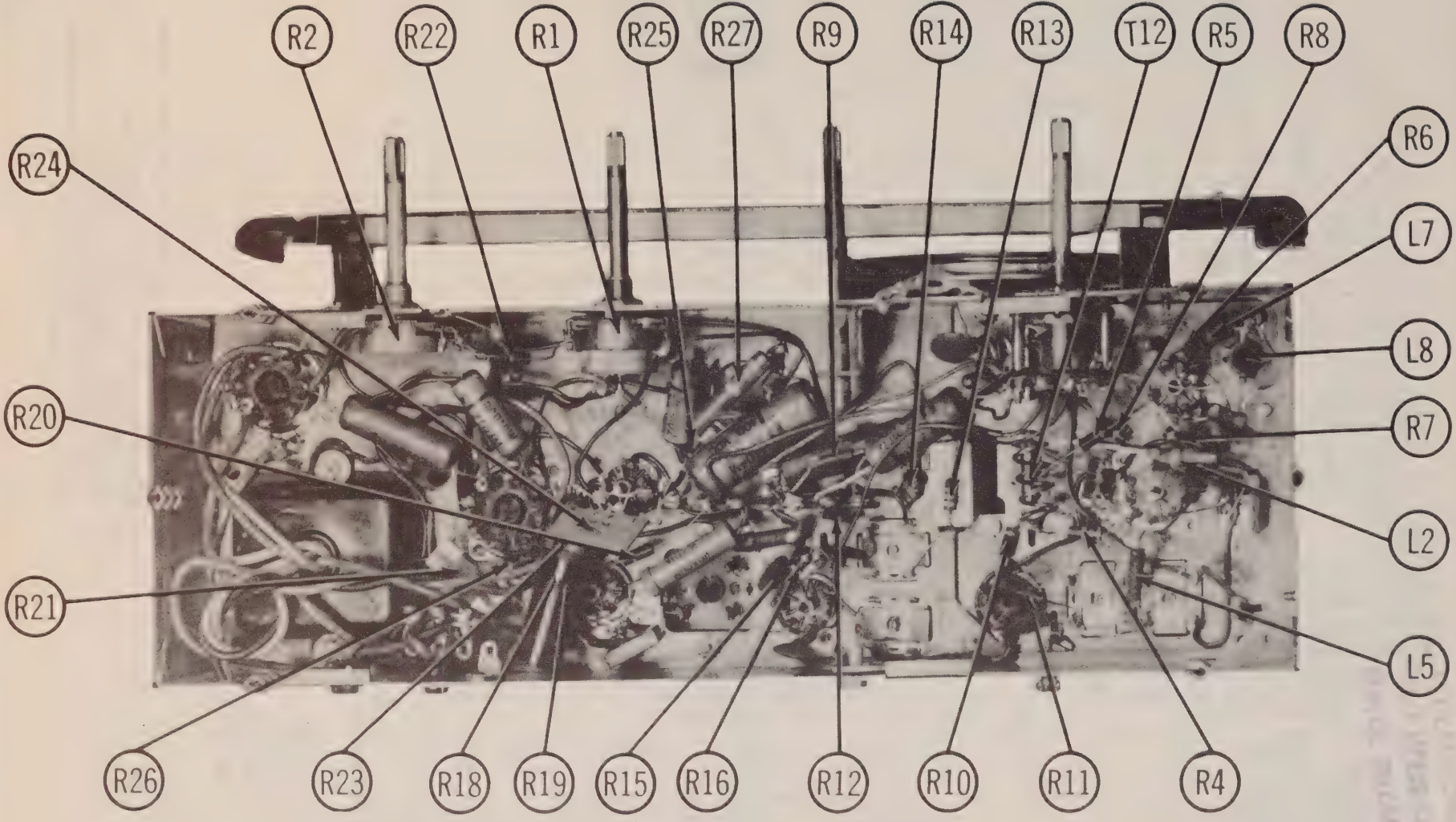
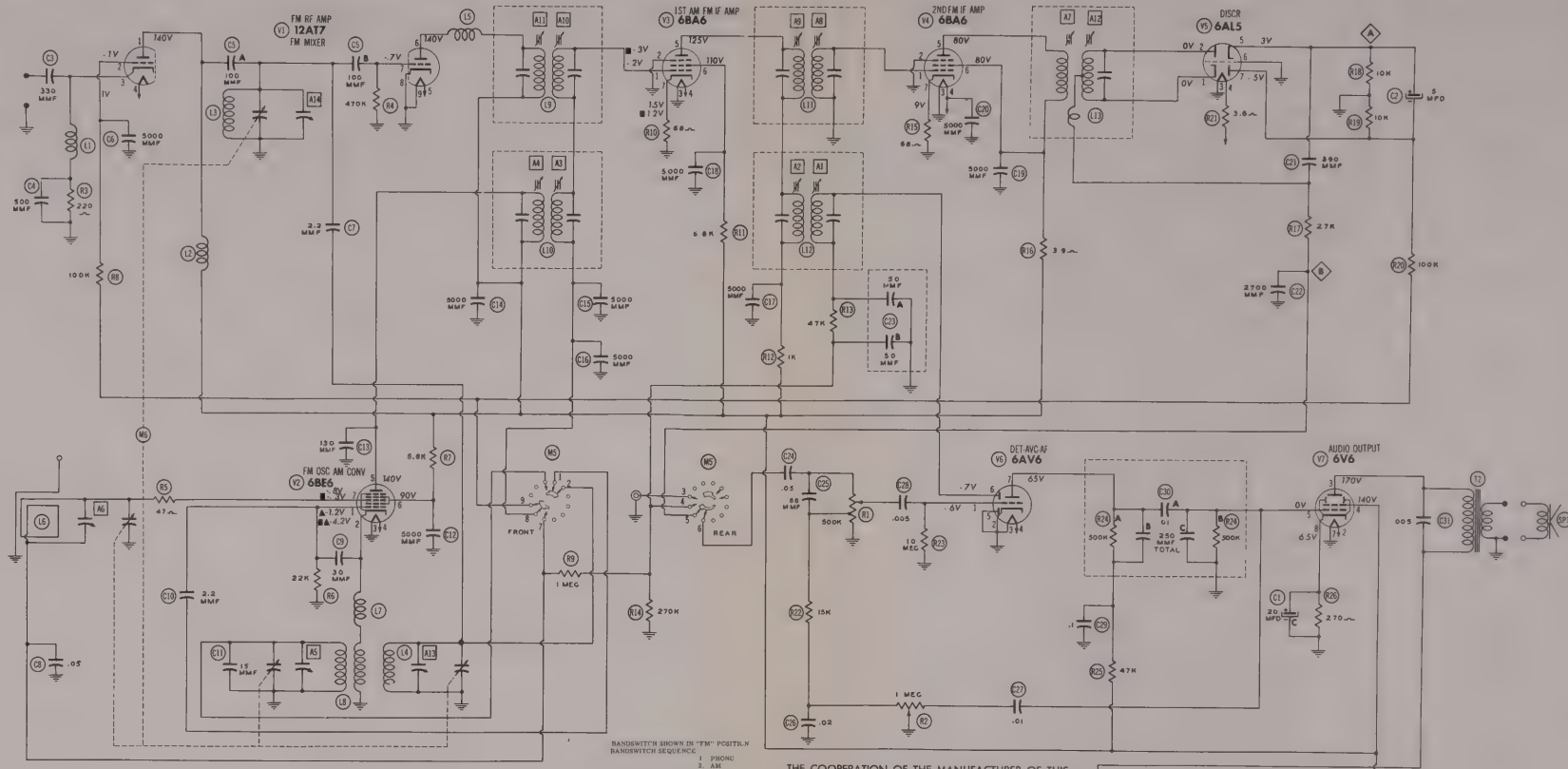


CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS - BOTTOM VIEW - RESISTOR IDENTIFICATION



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AT7	180Ω	210KΩ	220Ω	0Ω	0Ω	1820Ω	470Ω	0Ω	1Ω
V 2	6BE6	22KΩ	2.1Ω	0Ω	.1Ω	1820Ω	16.4KΩ	1.3Meg		
V 3	6BA6	10KΩ at 1Meg	0Ω	0Ω	.1Ω	21.8KΩ	17.8KΩ	68Ω		
V 4	6BA6	80	∞	0Ω	.1Ω	14.7KΩ	14.7KΩ	68Ω		
V 5	6AL5	INF.	INF.	0Ω	1.8Ω	10KΩ	0Ω	10KΩ		
V 6	6AV6	10 Meg	0Ω	0Ω	.1Ω	0Ω	317KΩ	150KΩ		
V 7	6V6GT	INF.	.1Ω	1420Ω	1880Ω	470KΩ	0Ω	0Ω	270Ω	
V 8	▮▮▮▮	INF.	0Ω	100Ω	INF.	120Ω	INF.	.1Ω	160KΩ	

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS NOTED
● MEASURED IN "AM" POSITION
† MEASURED FROM PIN 8 OF V8
▲ TAKEN WITH VACUUM TUBE VOLTMETER

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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187-12

ALIGNMENT INSTRUCTIONS

AM ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	455KC (400∿Mod)	AM	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4.	Adjust for maximum output.
2.	"	"	1620KC	"	"	"	A5	"
3.	50MMF	High side to external antenna terminal. Low side to chassis.	1400KC	"	Tune to 1400KC signal.	"	A6	Adjust for maximum output. If pointer is not at 1400KC on the dial reset to that point.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.001MFD	High side to pin 1 (grid) of 6BA6 (V3). Low side to chassis.	10.7MC (Unmod)	FM	Tuning gang fully open.	DC probe to point (A) Common to chassis.	A7, A8, A9	Adjust for maximum deflection.
5.	"	High side to stator plates of rear FM section of tuning gang. Low side to chassis.	"	"	"	"	A10, A11	"
6.	"	"	"	"	"	DC probe to point (B) Common to chassis.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ Modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.001MFD	High side to pin 1 (grid) of 6BA6 (V3). Low side to chassis.	10.7MC (450KC Swp	FM	Tuning gang fully open.	Vert. amp to point (A) Low side to chassis.	A7, A8, A9	Disconnect stabilizer capacitor C2. Adjust for curve of maximum amplitude and symmetry as in fig. 1.
5.	"	High side to stator plates of rear section of tuning gang. Low side to chassis.	"	"	"	"	A10, A11	"
6.	"	"	"	"	"	Vert. amp to point (B) Low side to chassis.	A12	Reconnect capacitor C2. Adjust so that 10.7MC occurs at center of crossover lines as in fig. 2 SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	270Ω Carbon Resistor	High side thru 270Ω to ungrounded FM antenna terminal.. Low side to chassis.	108.5MC (Unmod)	FM	Tuning gang fully open.	DC probe to point (A). Common to chassis.	A13	Adjust for maximum deflection.
8.	"	"	104.5MC	"	Tune for maximum deflection on VTVM	"	A14	"

FIG. 1

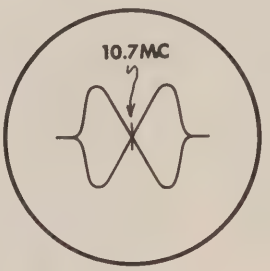


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		TRUETONE PART No.	STANDARD REPLACEMENT		
V1	FM RF Amplifier				
	FM Mixer	12AT7	12AT7	9A	
V2	FM Oscillator				
	AM Converter	6BE6	6BE6	7CH	
V3	1st FM AM IF Amp.	6BA6	6BA6	7BK	
V4	2nd FM Amplifier	6BA6	6BA6	7BK	
V5	AM Detector-AVC				
	AF Amplifier	6AV6	6AV6	7BT	
V6	Discriminater	6AL5	6AL5	6BT	
V7	Audio Output	6V6GT	6V6GT	7AC	
V8	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

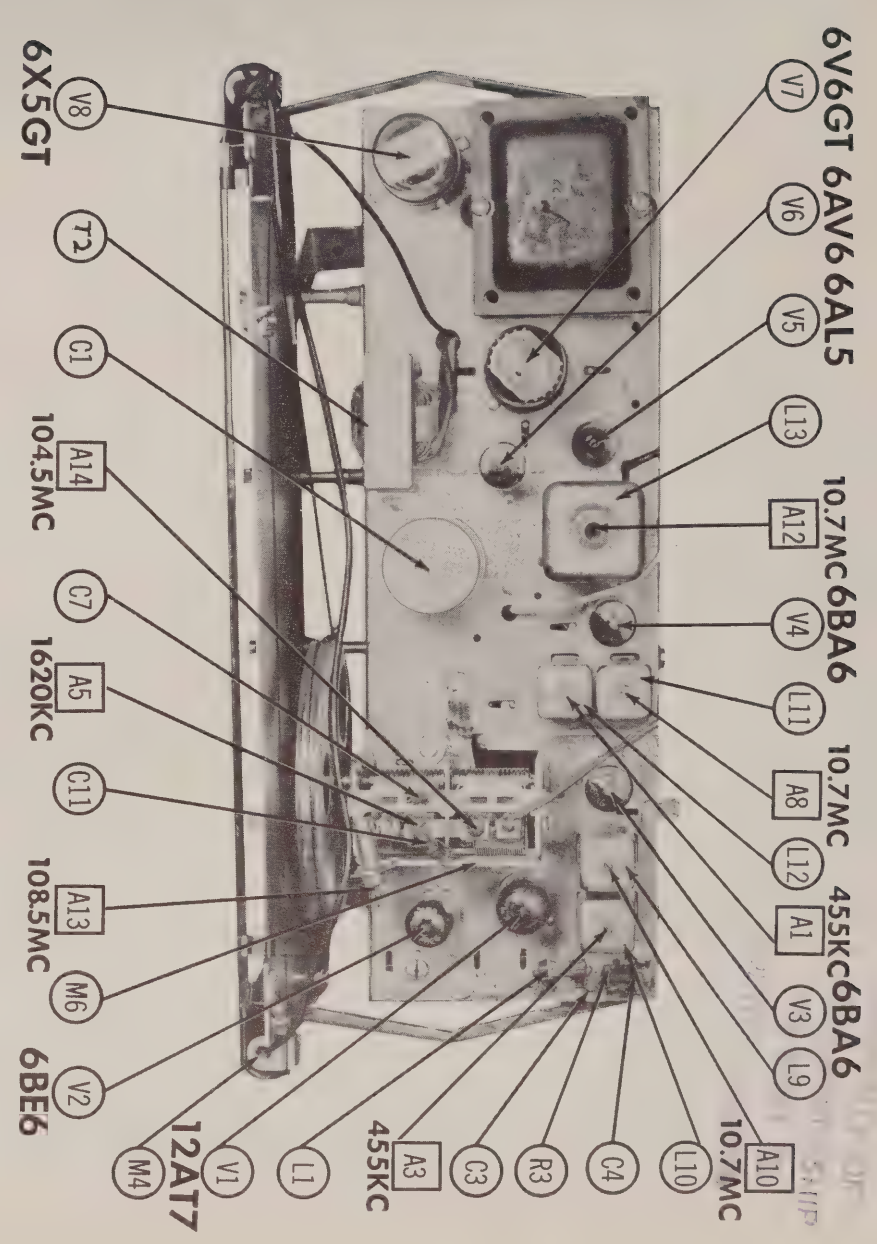
ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▪40	200	45X360	AFH 3-100		UP4445C		FP346	TVL-2575	
B	▪40	150							TVA-1205	
C	▲20	25								
C2	5	100	45X361	PRS150/4		BR415		TC40	TVA-1402	
C3	330	500	47X470		D6-331		GP1K-331	UC-5333	5GA-T33	
C4	500		47X508	SI500	D6-501	TM5T5	GP2K-501	UC-535	5GA-T5	
C5A	100		76X4	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
B	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C6	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C7	2.2		47X557		TCZ-2.2		NP0K-2R2		5TCCB-V22	
C8	.05	200	B66503	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C9	30		47X558		TCN-30		N750K-300			
C10	2.2		47X557		TCZ-2.2		NP0K-2R2		5TCCB-V22	
C11	15		47X552	SI15N750	TCN-15		N750K-150		5TCU-Q15	
C12	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C13	130		47X559		TCN-130		N750L-131			
C14	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C15	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C16	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C17	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C18	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C19	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C20	5000		47X507	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C21	390	500	47X571	1468-0004	D6-391	5W5T4	GP2K-391	MC243	1FM-34	
C22	2700		47X492	SI2700	D6-272		GP2-333-272	UC-5227	5GA-D27	
C23A	50		47X112	SI50	D6-500	TM5Q5	GP1K-500	UC-545	5GA-Q5	
B	50			SI50	D6-500	TM5Q5	GP1K-500	UC-545	5GA-Q5	
C24	.05	200	B66503	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C25	68	500	47X471	1469-000007	D6-680	5W5Q7	GP1K-680	UC-5468	5GA-Q68	
C26	.02	200	B66203	P488-02	DF-203	PJ2S2		PT412	2TM-S2	
C27	.01	200	866103	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C28	.005	400	D66502	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C29	.1	400	D66104	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C29A	.01				♦PC-80		♦1404-01		♦102C1	
B	250									
C										
C31	.005	800	H66502	P1088-005		PTE16D5		PT1625	MB-D5	

♦ Items C30A, C30B, C30C, R24A, R24B are combined in one unit.
When replacing items separately C30B and C30C should total 250 MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Truetone PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	36X372	Q13-133X	AT-78	BTSK-66-S	UT-430	Volume-Tap @ 120KΩ
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SW-A	Not Req.	US-26	Attach to R1A
R2A	1 Meg	½	40X341	Q11-137	AG-61-S	AB-69	U-54	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA TRUETONE PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R3	220Ω	1/2	B84221	BTS-220	
R4	470KΩ	1/2	B85474	BTS-470K	
R5	47Ω	1/2	B85470		
R6	22KΩ	1/2	B85223	BTS-22K	
R7	5600Ω	1/2	B85562	BTS-5600	
R8	100KΩ	1/2	B85104	BTS-100K	
R9	1 Meg	1/2	B85105	BTS-1 Meg	
R10	68Ω	1/2	B84680		
R11	6800Ω	1/2	B84682	BTS-6800	
R12	1000Ω	1/2	B85102	BTS-1000	
R13	47KΩ	1/2	B85473	BTS-47K	
R14	270KΩ	1/2	B84274	BTS-270K	
R15	68Ω	1/2	B84680		
R16	3900Ω	1/2		BTS-3900	
R17	27KΩ	1/2	B85273	BTS-27K	
R18	10KΩ	1/2	B84103	BTS-10K	
R19	10KΩ	1/2	B84103	BTS-10K	
R20	100KΩ	1/2	B85104	BTS-100K	
R21	3.6Ω	1/2	43X233		
R22	15KΩ	1/2	B85153	BTS-15K	
R23	10 Meg	1/2	B85106	BTS-10 Meg	
R24A	500KΩ	1/2	♦ 76X5		
B	500KΩ	1/2			
R25	47KΩ	1/2	B85473	BTS-47K	
R26	270Ω	1/2	B84271	BTS-270	
R27	820Ω	2	D84821	BTB-820	

♦ Items R24A, R24B, C30A, C30B, C30C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA TRUETONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC @ .37A	354VCT .070ADC	6.3VAC @ 3.2A		53X322				

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA TRUETONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	6.8KΩ	3.4Ω	420Ω	.78Ω	51X134	A-3878 ①	A-2931 ①	RO-13 ①	S-7X ①	① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA TRUETONE PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	8"	PM	3.4Ω	12A477 12A505 ①	ST-115 Mod. P8-V	8A31	① Alternate 8" Speaker

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA TRUETONE PART No.	MERIT PART No.	IRC PART No.	NOTES
L1	FM Ant-Coil	.22Ω		35A9		CLA	.47 Microhenry
L2	FM RF Choke	.3Ω		35A8		CLA	3.3Microheneries
L3	FM RF Coil	0Ω		9A2066			
L4	FM Osc. Coil	0Ω		9A2067			
L5	Parasitic Choke	0Ω		9A2103			
L6	AM Loop Ant	.1Ω	1.4Ω	9A2099			
L7	Cathode Choke	1.8Ω		35A5		CLA	2.2Microheneries
L8	AM Osc. Coil	.3Ω	4.9Ω	9A2065			
L9	1st. FM IF	1Ω	.8Ω	9A2060	FM-254		
L10	1st. AM IF	19Ω	15Ω	9A2062	BC-352		
L11	2nd FM IF	.8Ω	.8Ω	9A2276	FM-254		
L12	2nd AM IF	12.5Ω	15Ω	9A2063	BC-353		
L13	Ratio Det.	2.2Ω	.1Ω CT	9A2260	FM-352		Tertiary Windings .25Ω

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA TRUETONE PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	SHURE PART No. CARTRIDGE	SHURE PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M1	AC-AC-J	AC-AG-J	A-AG	W26B	A66U	33	0-2 or S-2	

ASTATIC, SHURE AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

PARTS LIST AND DESCRIPTIONS (Continued)

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

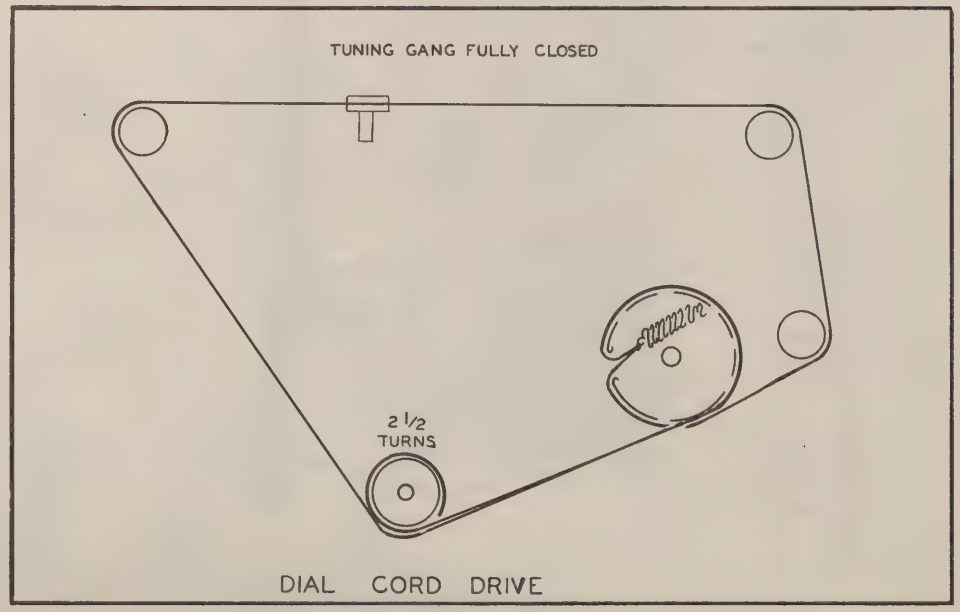
ITEM No.	REPLACEMENT DATA TRUETONE PART No.	WALCO PART No.	JENSEN PART No.	REMARKS
M2	A-AG	W-5AGA or W-5AGS	A-752 or A-852	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA TRUETONE PART No.		NOTES
M3	Bayonet	6-8	.15	Brown	7A103		Type No. #47
M4	Bayonet	6-8	.15	Brown	7A103		Type No. #47

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M5	Switch	2A393	Phono-AM-FM
M6	Tuning Capacitor	14A209	14-520MMF-24-204MMF
A6	Trimmer	17A256	AM ANT (2-24MMF)
A13	Trimmer	17A255	FM Osc. (1-8MMF)
	Cabinet	252	
	Escutcheon	4X1183	
	Knobs	10A759	(4 used) Tone, Off/On Volume, Tuning & Phono-AM FM SW.
	Dial Glass	58X763	



V-M MODEL
160

V-M MODEL
160

TRADE NAME	V-M Model 160
MANUFACTURER	V-M Corp., Benton Harbor, Mich.
TYPE SET	AC Operated Audio Amplifier
TUBES (Five)	12AY7 Pre-Amp., 12AX7 AF Amp.-Phase Inv., 6V6GT Audio Output, 6V6GT Audio Output 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts - 60 Cycle RATING .74 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		V-M PART No.	STANDARD REPLACEMENT		
V1	Pre Amplifier	12AY7	12AY7	9A	
V2	AF Amplifier Phase Inverter	12AX7	12AX7	9A	
V3	Audio Output	6V6GT	6V6GT	7AC	
V4	Audio Output	6V6GT	6V6GT	7AC	
V5	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	V-M PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	20	450		AFH 4-14		UPT222245		FP444	TVL-4763	
B	▲20	450								
C	▲20	450								
D	■20	450								
C2	10	25		PRS25/10		BR102A		TC22	TVA-1204	
C3	.047	400		P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C4	.047	400		P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C5	.003	400		P688-003	D6-302	PTE6D3	GP2-333-302	PT623	6TM-D3	
C6	.003	400		P688-003	D6-302	PTE6D3	GP2-333-302	PT623	6TM-D3	
C7	.047	400		P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C8	.047	400		P488-047	DF-503	PTE4S47		PT4147	4TM-S47	

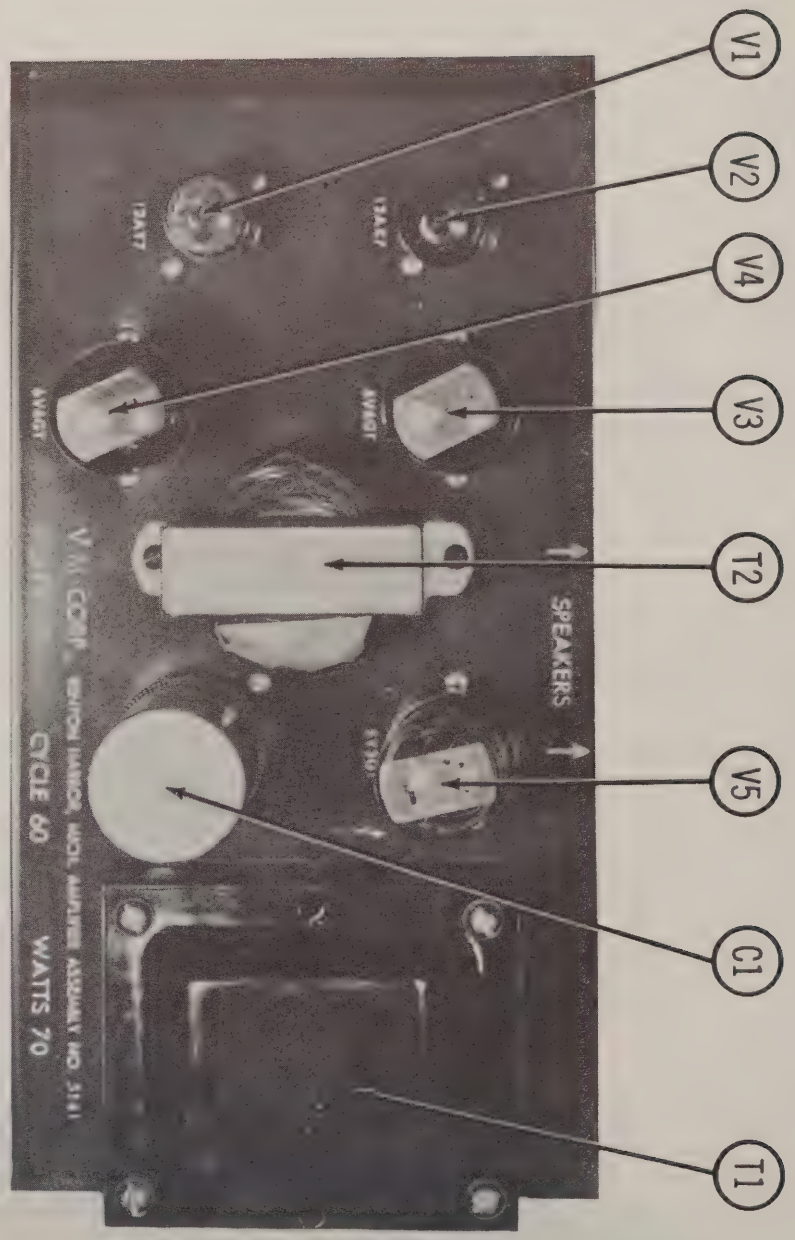
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	V-M PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	1/2	11947	Q13-133X	AT-78	BTSK-66	UT-427	Phono Volume-Tap @ 95KΩ
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
R2A	500KΩ	1/2	11949	Q13-133	AG-60-Z	BSK-60	U-48	Mike Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req	Not Req.	Attach to R2A
R3A	1.5Meg	1/2	11950	Q11-138	AG-83-S	AB-75	U-155	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R3A
C	Switch		Not Req.	76-1	SWB	KB-1	US-26	Attach to R3A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES	ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	V-M PART No.	IRC PART No.			OHMS	WATT	V-M PART No.	IRC PART No.	
R4	4.7Meg	1/2		BTS-4.7Meg		R15	100KΩ	1/2		BTS-100K	
R5	4700Ω	1/2		BTS-4700		R16	1000Ω	1/2		BTS-1000	
R6	100KΩ	1/2		BTS-100K		R17	100KΩ	1/2		BTS-100K	
R7	10Meg	1/2		BTS-10Meg		R18	470KΩ	1/2		BTS-470K	
R8	10KΩ	1/2		BTS-10K		R19	10KΩ	1/2		BTS-10K	
R9	47KΩ	1/2		BTS-47K		R20	300Ω	5		1 3/4A-300	
R10	220KΩ	1/2		BTS-220K		R21	470KΩ	1/2		BTS-470K	
R11	220KΩ	1/2		BTS-220K		R22	10KΩ	1/2		BTS-10K	
R12	10KΩ	1/2		BTS-10K		R23	10KΩ	1/2		BTS-10K	
R13	1000Ω	1/2		BTS-1000		R24	470Ω	2		BTB-470	
R14	47Ω	1/2									

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	V-M PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC @ .74A.	720VCT .098ADC	5VAC @ 2 A	6.3VAC CT @ 1.7A		PM- 8410	P-2953	PH-120B	R-14P

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		V-M PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T2	8.6KΩ	8Ω	436Ω CT	.48Ω SEC. 2 11.2Ω						

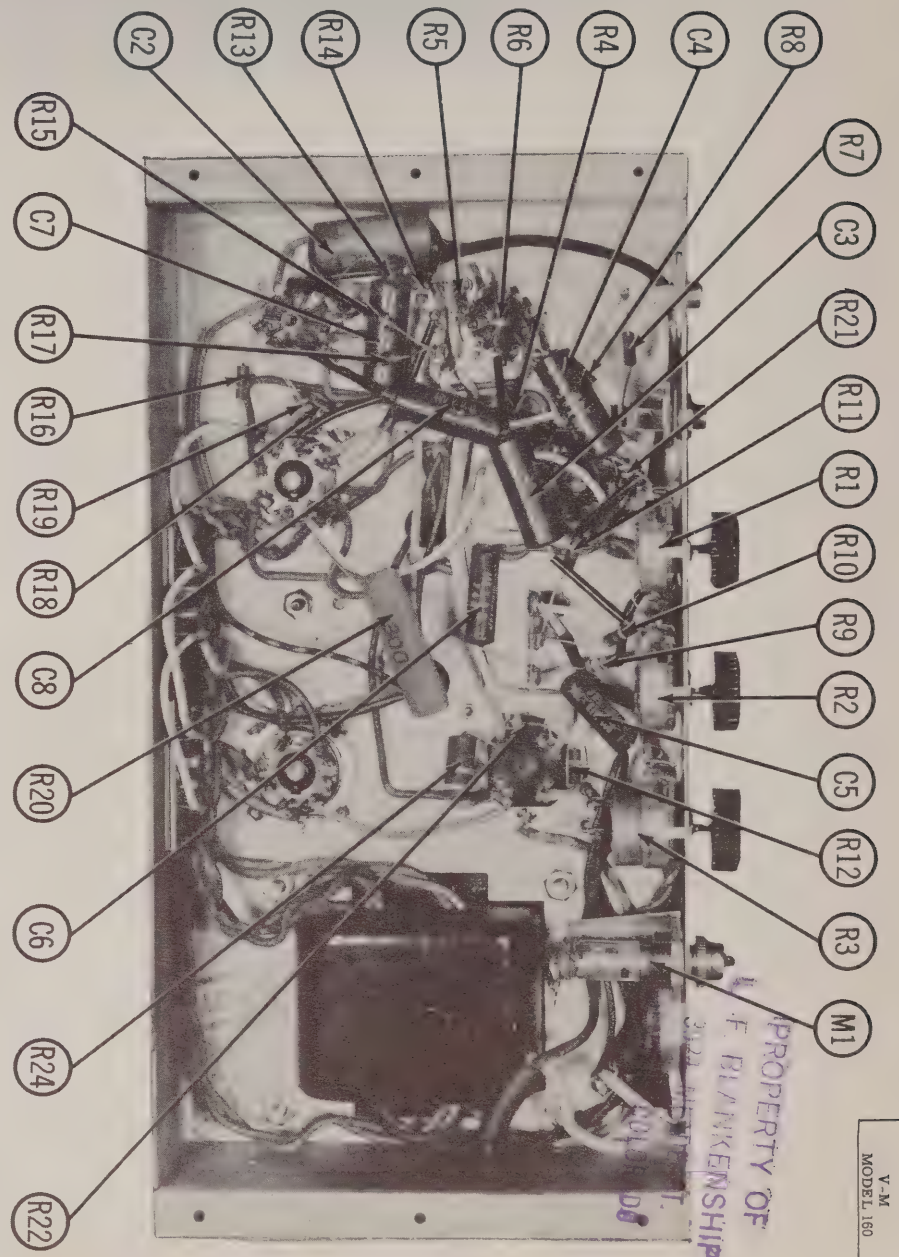
SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	V-M PART No.	JENSEN PART No.	QUAM PART No.	
SP1	10"	PM	8Ω		ST-120 Mod. P10-S	10A4	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					V-M PART No.		
M1	Bayonet	6-8	.15	Brown			Type #47

CHASSIS—BOTTOM VIEW



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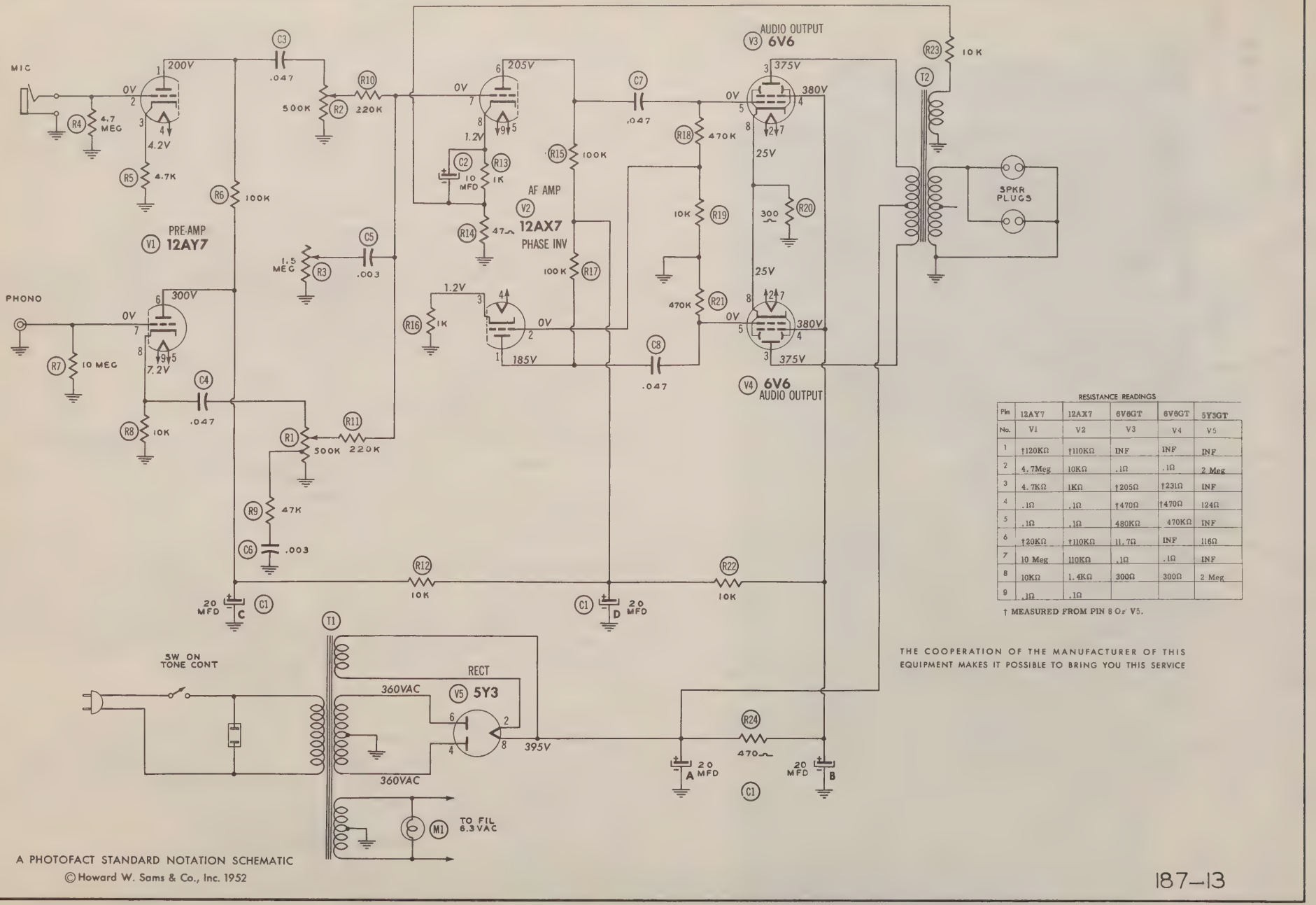
V-M MODEL 160



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RESISTANCE READINGS

Pin No.	12AY7 V1	12AX7 V2	6V6GT V3	6V6GT V4	5Y3GT V5
1	†120KΩ	†110KΩ	INF	INF	INF
2	4.7Meg	10KΩ	.1Ω	.1Ω	2 Meg
3	4.7KΩ	1KΩ	†205Ω	†231Ω	INF
4	.1Ω	.1Ω	†470Ω	†470Ω	124Ω
5	.1Ω	.1Ω	480KΩ	470KΩ	INF
6	†20KΩ	†110KΩ	11.7Ω	INF	116Ω
7	10 Meg	110KΩ	.1Ω	.1Ω	INF
8	10KΩ	1.4KΩ	300Ω	300Ω	2 Meg
9	.1Ω	.1Ω			

† MEASURED FROM PIN 8 OF V5.

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

187-13

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

PHOTOFACT* Folder

*TRADE MARK

ZENITH MODELS K2230E, R, K2240E, R, K2260R, K2263E, K2266, R, K2267E, K2268R, K2270H, R, K2287R, K2290R, K2291E, (Ch. 21K20)

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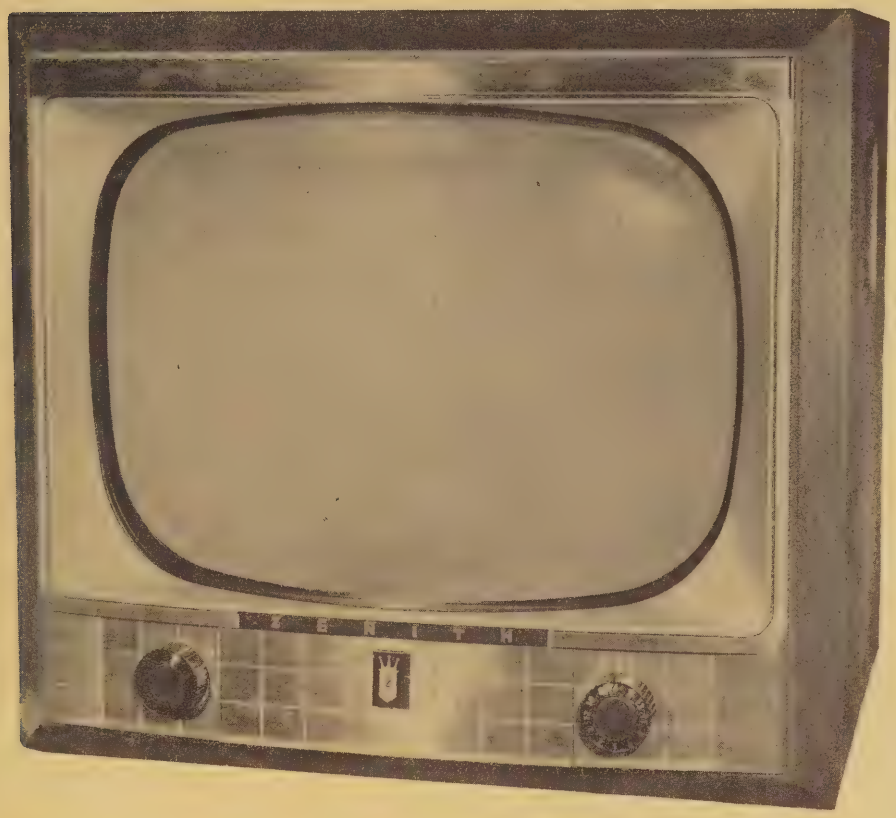

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MODEL K2230R

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DATE 12-52 SET 187 FOLDER 14

PHOTOFACT* Folder

*TRADE MARK

ZENITH MODELS K2230E, R, K2240E, R, K2260R, K2263E, K2266, R, K2267E, K2268R, K2270H, R, K2287R, K2290R, K2291E, (Ch. 21K20)

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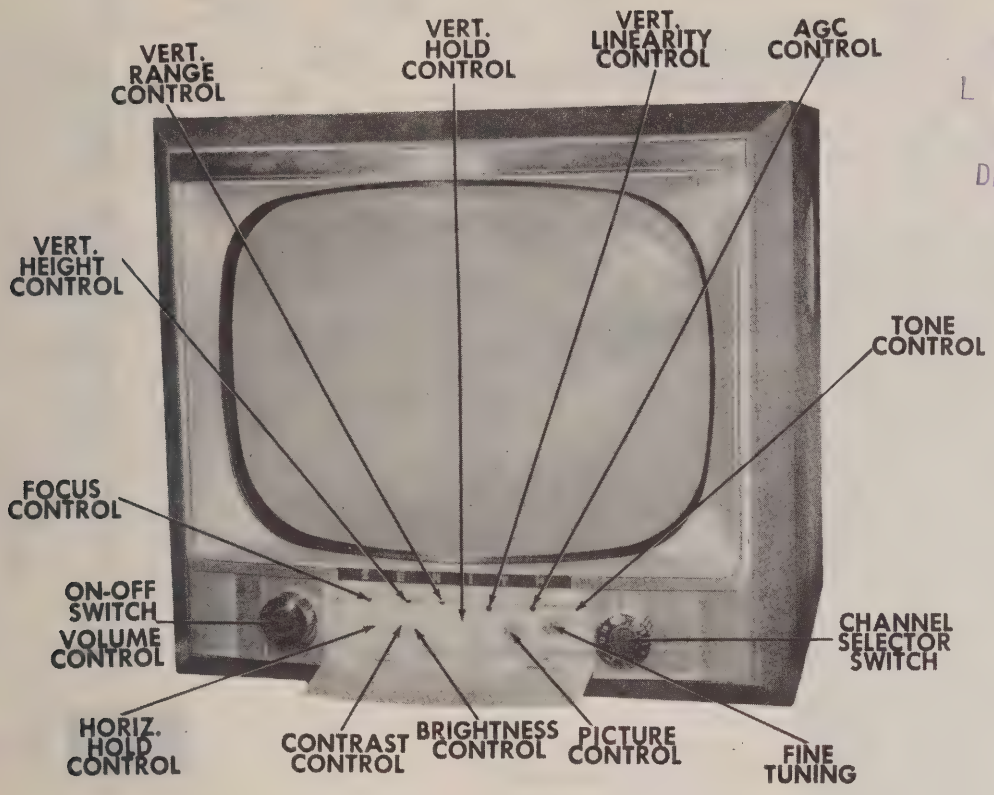

ZENITH K2230R

TRADE NAME	Zenith Models	TV Chassis	Radio Chassis
	K2230E, R, K2240E, R K2260R, R2263E, R2266, R, K2267E, K2268R, K2270H, R	21K20	
	K2287R	21K20	8H20Z
	K2290R, K2291E	21K20	10H20Z
MANUFACUTRER	Zenith Corp., 6001 Dickens Ave., Chicago 39, Ill.		
TYPE RECEIVER	Television Receiver		
TUBES	Twenty-One		
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 2 Amp @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13		

FOR SERVICE INFORMATION ON RADIO CHASSIS 8H20Z, SEE MODEL J880 PHOTOFACT SET 168, FOLDER 14
FOR SERVICE INFORMATION ON RADIO CHASSIS 10H20Z, SEE MODEL H2229R PHOTOFACT SET 151, FOLDER 13

INDEX

Alignment Instructions 6,7
Drive Cord Stringing 7
Disassembly Instructions 11
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions 12, 13, 14
Photographs
Cabinet-Rear View 11
Capacitor and Alignment Identification 4, 9
Chassis -Top View 3
Photographs
RF Tuner 10
Resistor and Inductor Identification 15, 16
Resistance Measurements 8
Schematic 2
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

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DATE 12-52 SET 187 FOLDER 14

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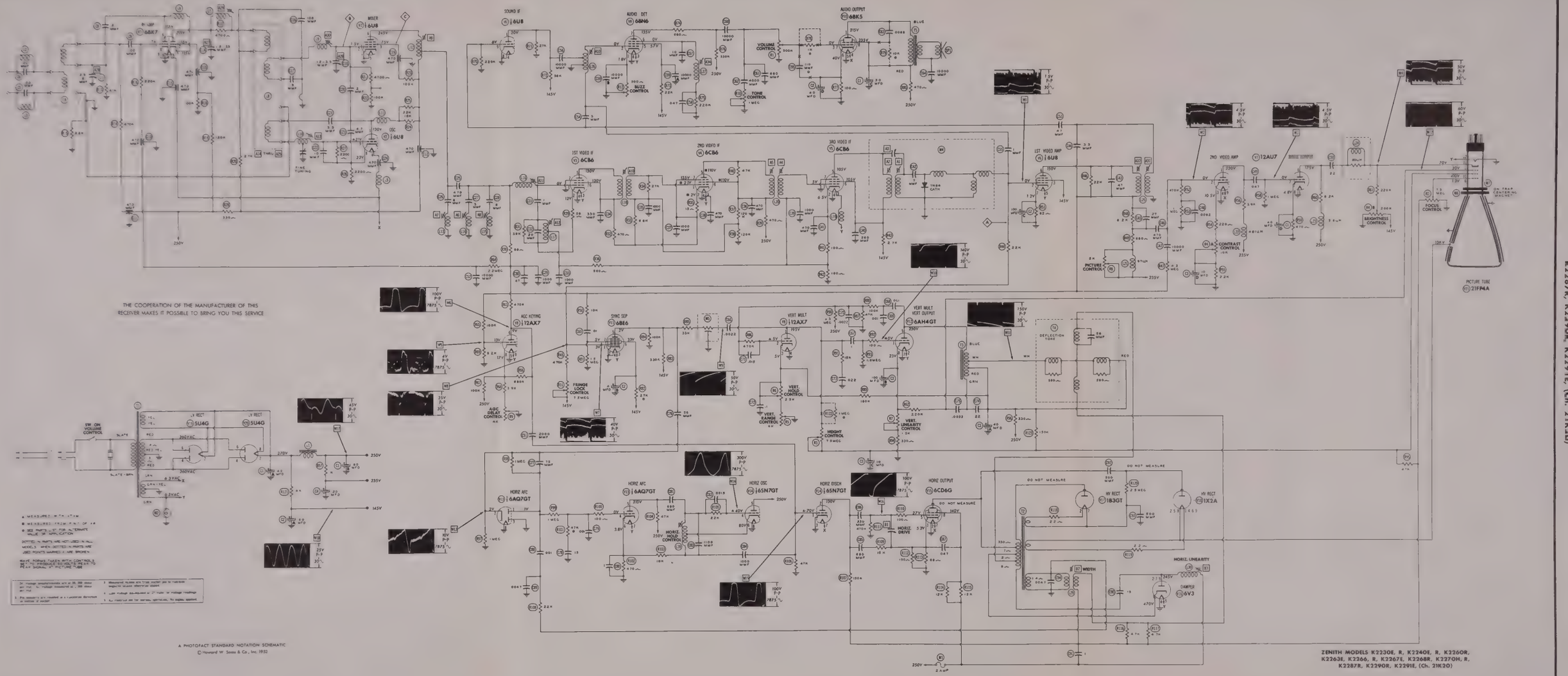

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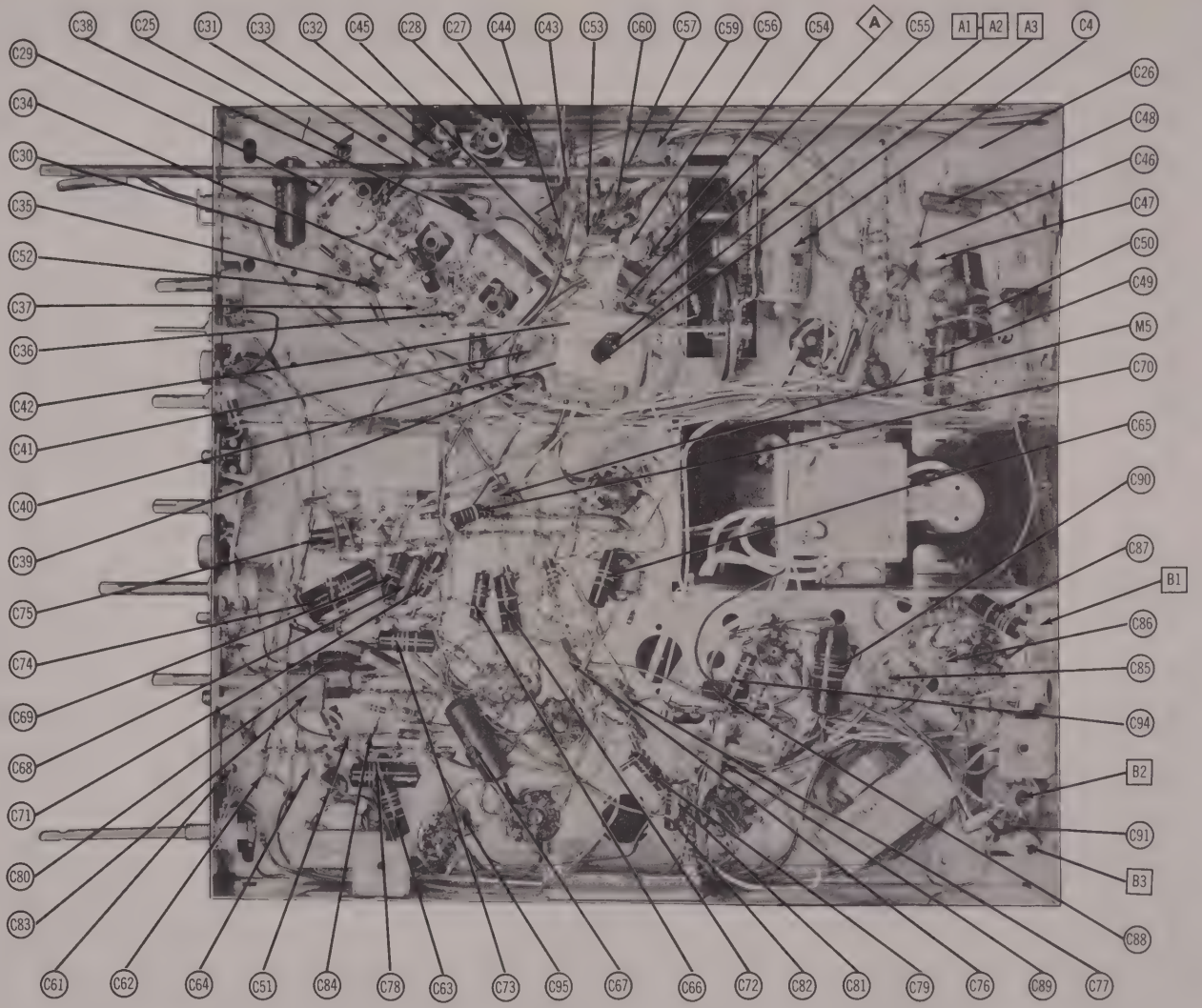
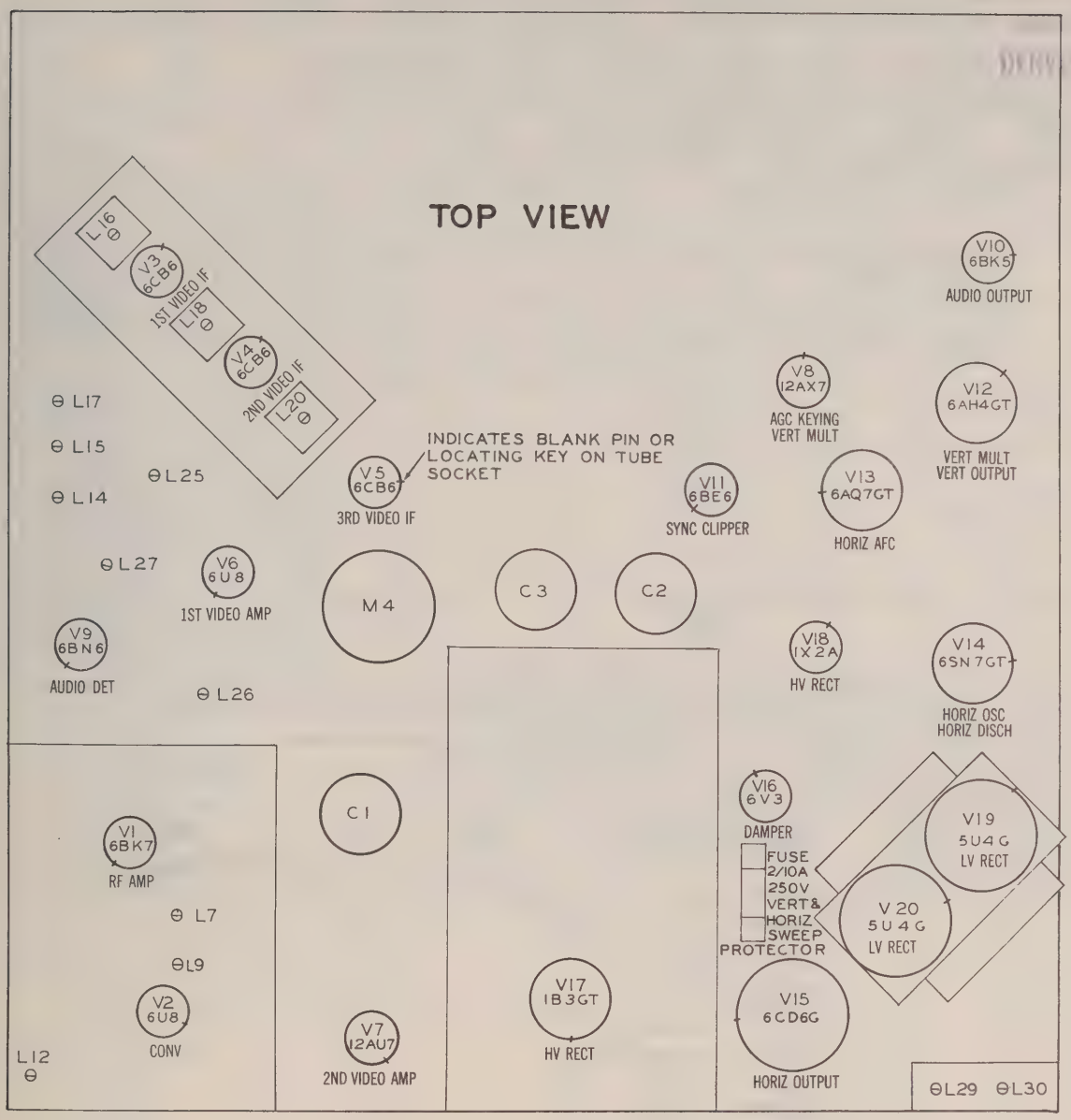
ZENITH MODELS K2230E, R, K2240E, R, K2260R, K2263E, K2266, R, K2267E, K2268R, K2270H, R, K2287R, K2290R, K2291E, (Ch. 21K20)

CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-V19, V20

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5
No pic, no sound, has snow-V1, V2, V3
No pic, has sound, has raster-V6, V7, V21
Has pic, no sound-V6, V9, V10
Overloaded picture-V8

SUNC FAILURE
No vert. sync-V11, V8, V12
No horiz. sync. -V11, V13, V14
No vert or horiz. sync-V11

SWEEP FAILURE
No raster, has sound-V14, V15, V16, V17, V18, V21 Fuse (M1)
No vertical deflection-V12
Poor vert. linearity or foldover-V8, V12
Poor horiz. linearity or foldover-V14, V15, V16
Narrow picture-V14, V15, V16, V17, V18, V19, V20
Vert. off freq. -V11, V8, V12
Horiz. off freq. -V11, V13, V14

ZENITH MODELS K2230E, R, K2240E, R, K2260R, K2263E, K2266, R, K2267E, K2268R, K2270H, R, K2287R, K2290R, K2291E, (Ch. 21K20)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative lead of a 2 volt battery to the ungrounded side of C30. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470MMF	High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis.	44MC (10MC Swp.)	44MC	Any non-interfering channel.	Vert amp. through 10KΩ to point (A). Low side to chassis.	A1, A2 A3	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1. A3 is an adjustable coupling "gimmick" which may be rotated with the fingers. Attenuate generator for 2 volt peak to peak on scope.
2.	"	High side to pin 1 (grid) of 6CB6 (V4). Low side to chassis.	"	"	"	"	A4, A5	Pre-set the bottom slug half way out of coil and the top slug all the way out of coil. Adjust for response similar to Fig. 2.
3.	"	High side to point (B) (on top of tuner). Low side to chassis.	"	39.75MC 41.25MC 47.25MC	"	"	A6, A7 A8	Remove the bias battery and set scope gain to amplify the trap region of the response curve. Adjust for MINIMUM marker amplitude.
4.	"	"	"	42.75MC 45MC 45.75MC	"	"	A9, A10 A11	Replace bias battery. Adjust for response curve similar to Fig. 3. If necessary, retouch A1 through A5 for desired response.
5.	"	"	"	41.25MC 42.75MC 45MC 45.75MC	"	"	A12	Change bias from -2 to ±3 Volts. Response shouls appear as the solid line portion of Fig. 4. Adjust A12 for maximum flattening of the 45MC portion of the response as indicated by the dotted lines. Return bias to -2 Volts. Check for response as in Fig. 3. If necessary, make slight re-adjustments of A1 thru A5, and A9 thru A11 for desired response.
6.	"	"	"	42.75MC 45MC 45.75MC	"	"		Return bias to -2 volts. Check for response as in Fig. 3. If necessary, make slight re-adjustments of A1 thru A5, and A9 thru A11 for desired response.

OSCILLATOR ALIGNMENT

The master oscillator adjustment of A13 is to be made only if adjustment of the individual channel oscillator adjustment fail to bring the channels within the range of the fine tuning control. If channels 2 through 6 fall within the range of the fine tuning control but the higher channels do not, slight adjustment of A13 may bring the higher channels in.
Connect the negative lead of a 1 volt bias supply to the ungrounded side of C30. Connect the positive lead to chassis.
Turn the oscilloscope gain up so that the sound trap notch in the response curve becomes visible.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω resistors	Across antenna terminals with 120Ω in each lead.	57MC (10MC Swp.)	59.75MC	2	Vert. amp. to point (A). Low side to chassis	A14	Adjust to place sound marker in notch as in Fig. 5.
			63MC (10MC Swp.)	65.75MC	3		A15	
			69MC (10MC Swp.)	71.75MC	4		A16	
			79MC (10MC Swp.)	81.75MC	5		A17	
			85MC (10MC Swp.)	87.75MC	6		A18	
			177MC (10MC Swp.)	179.75MC	7		A19	
			183MC (10MC Swp.)	185.75MC	8		A20	
			189MC (10MC Swp.)	191.75MC	9		A21	
			195MC (10MC Swp.)	197.75MC	10		A22	
			201MC (10MC Swp.)	203.75MC	11		A23	
			207MC (10MC Swp.)	209.75MC	12		A24	
			213MC (10MC Swp.)	215.75MC	13		A25	

ALIGNMENT INSTRUCTIONS (CONT.)

RF AND MIXER ALIGNMENT

Leave bias battery connected as under Oscillator Alignment.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ihms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	63MC (10MC Swp)	61.25MC 65.75MC	3	Vert. amp. thru 10KΩ to point Ⓒ (accessible) on top of tuner.) Low side to chassis.	A26, A27 A28	Adjust for response curve similar to Fig. 6.
9.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"	A29, A30	Adjust for symmetry of response curve of response curve as in Fig. 7.

SOUND IF ALIGNMENT

Connect an attenuator (Zenith part #S-17203 or equivalent) in series with the receiver antenna.
Tune in a tone modulated TV signal and adjust the attenuator until the signal falls below the limiting level of the 6BN6 limiter-detector, as evidenced by a hiss similar to superregeneration
Adjust the sound take off transformer, (A31 and A32), the sound IF coil (A33), and the quadrature coil (A34), for maximum sound of best quality.
Adjust the buzz control (R12) for minimum intercarrier buzz.
If the intercarrier buzz cannot be eliminated with the buzz control check the setting of the AGC delay adjustment.
If during the sound IF alignment the signal rises above the limiting level (hiss disappears) increase the attenuation until the hiss returns.

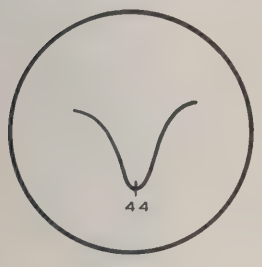


FIG.1

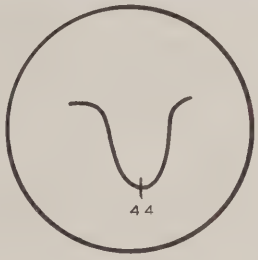


FIG. 2

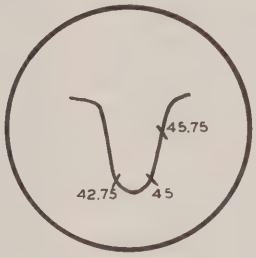


FIG.3

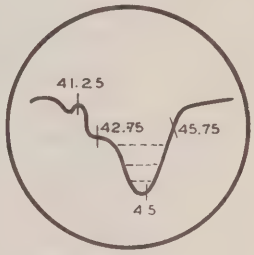
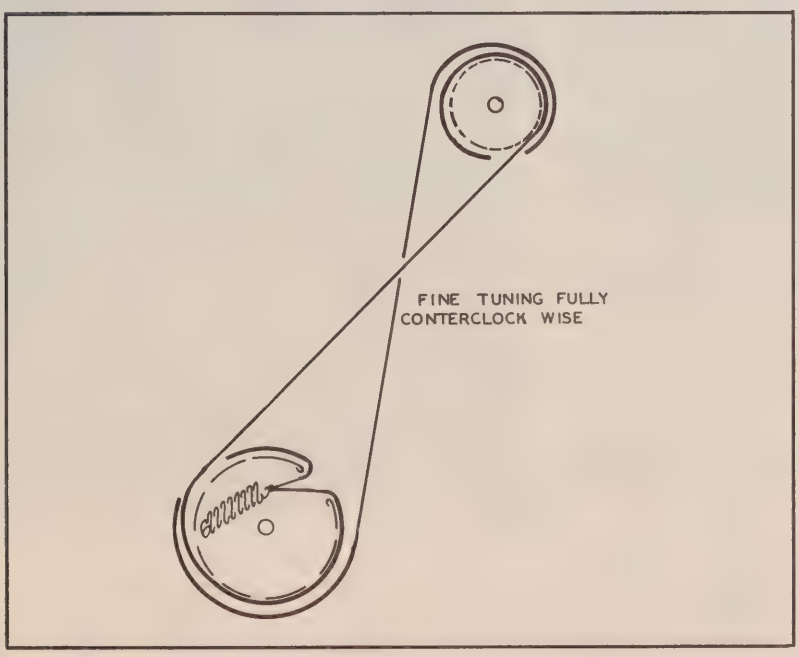


FIG.4

FIG.5

FIG.6

FIG.7



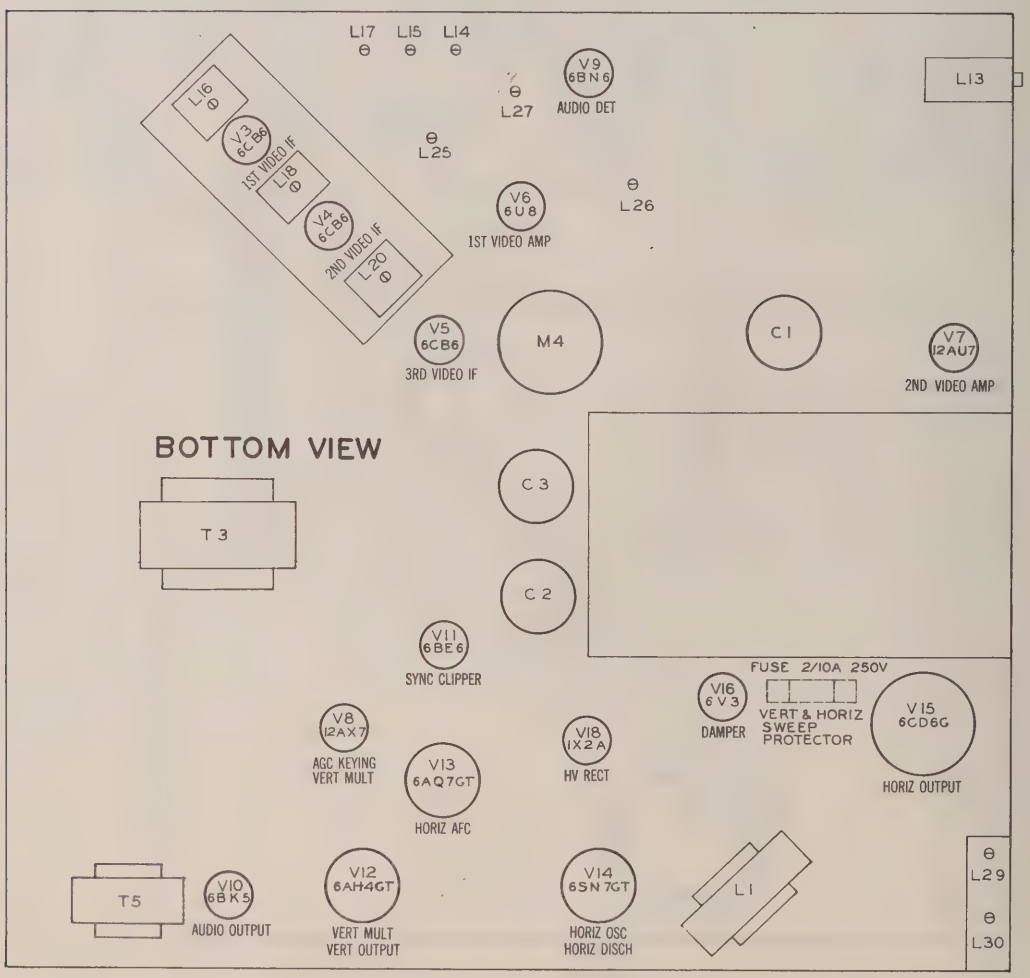
FINE TUNING DRIVE CORD STRINGING

ZENITH MODELS K2230E, R, K2240E, R, K2260R, K2263E, K2266, R, K2267E, K2268R, K2270H, R, K2287R, K2290R, K2291E, (Ch. 21K20)

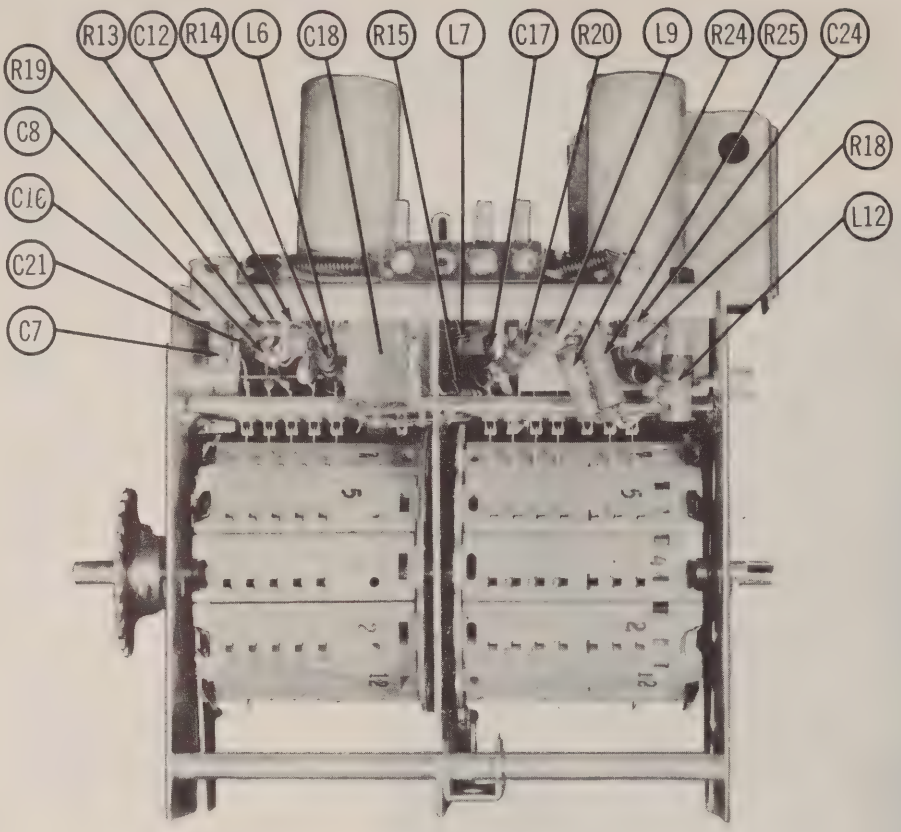
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BK7	†3.1KΩ	60KΩ	INF	0Ω	.1Ω	INF	3.6Meg	0Ω	0Ω
V 2	6U8	†11KΩ	100KΩ	†100KΩ	.1Ω	0Ω	†400Ω	0Ω	2.2KΩ	4.4KΩ
V 3	6CB6	1.2Meg	800Ω	.1Ω	0Ω	67KΩ	67KΩ	0Ω		
V 4	6CB6	60KΩ	66KΩ	.1Ω	0Ω	†540Ω	†540Ω	66KΩ		
V 5	6CB6	180Ω	280Ω	.2Ω	0Ω	†6.5KΩ	†6.5KΩ	0Ω		
V 6	6U8	22KΩ	140Ω	†3.7KΩ	0Ω	.1Ω	†7.9KΩ	82Ω	0Ω	220KΩ
V 7	12AU7	†5KΩ	1.5Meg	3.2KΩ	0Ω	0Ω	†8.3Ω	1Meg	470Ω	.1Ω
V 8	12AX7	#2.7Meg	515KΩ	3.4KΩ	0Ω	0Ω	680KΩ	8.2KΩ	6.3KΩ	.1Ω
V 9	6BN6	400Ω	4.6Ω	.1 Ω	0Ω	†25KΩ	220KΩ	†330KΩ		
V 10	6BK5	†1.1KΩ	INF	70KΩ	.1Ω	0Ω	100Ω	70KΩ	†540Ω	70KΩ
V 11	6BE6	22KΩ	0Ω	.1Ω	0Ω	80KΩ	†30KΩ	1.5Meg		
V 12	6AH4GT	1.8Meg	.1Ω	1.8Meg	INF	†770Ω	INF	0Ω	960Ω	
V 13	6AQ7GT	2Meg	1Meg	0Ω	3Meg	†47KΩ	470Ω	.1Ω	0Ω	
V 14	6SN7GT	47KΩ	#750KΩ	0Ω	32KΩ	†71Ω	10KΩ	.1Ω	0Ω	
V 15	6CD6G	INF	0Ω	45Ω	INF	470KΩ	470KΩ	.1Ω	†6.7KΩ	TOP CAP #7Ω
V 16	6V3	†71Ω	†83Ω	INF	0Ω	.1Ω	INF	†83Ω	Pin 8 1.5Ω / Pin 9 †83Ω	TOP CAP 180KΩ
V 17	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								TOP CAP #337Ω
V 18	1X2A	PINS 1 - 9 HAVE INF RESISTANCE								TOP CAP #INF
V 19	5U4G	INF	15KΩ	INF	13Ω	INF	14Ω	INF	15KΩ	
V 20	5U4G	INF	15KΩ	INF	13Ω	INF	14Ω	INF	15KΩ	
V 21	21FP4A	0Ω	220KΩ	PIN 6 25KΩ	Pin 10 #47KΩ	Pin 11 240KΩ	Pin 12 .1Ω			

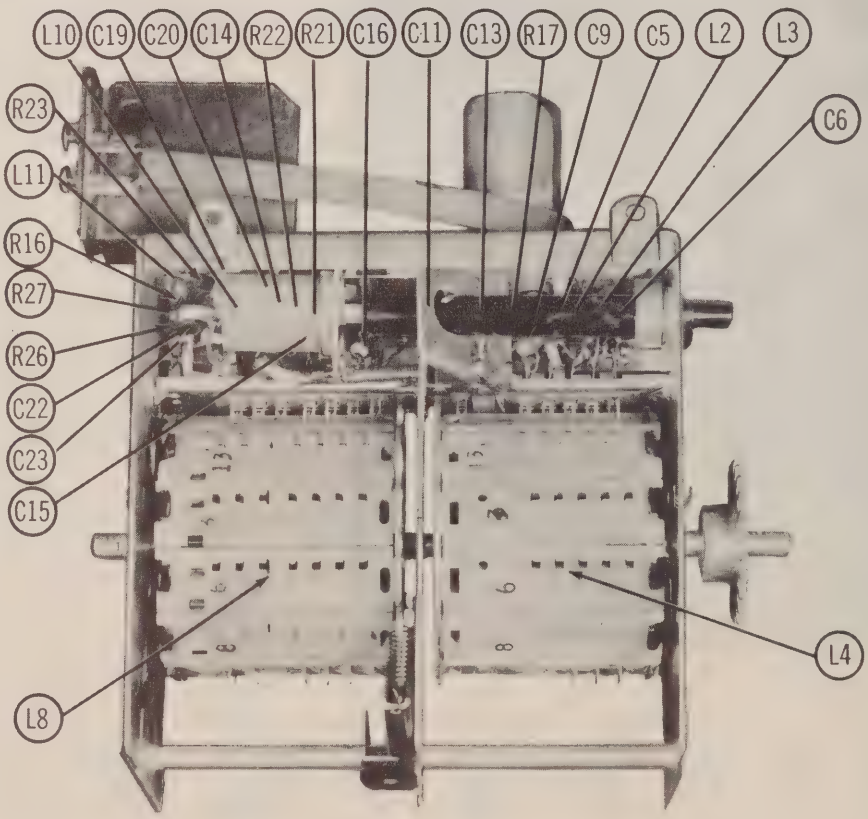
ALL CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED
† MEASURED FROM PIN 2 OF V19 & V20
# MEASURED FROM TOP CAP OF V16



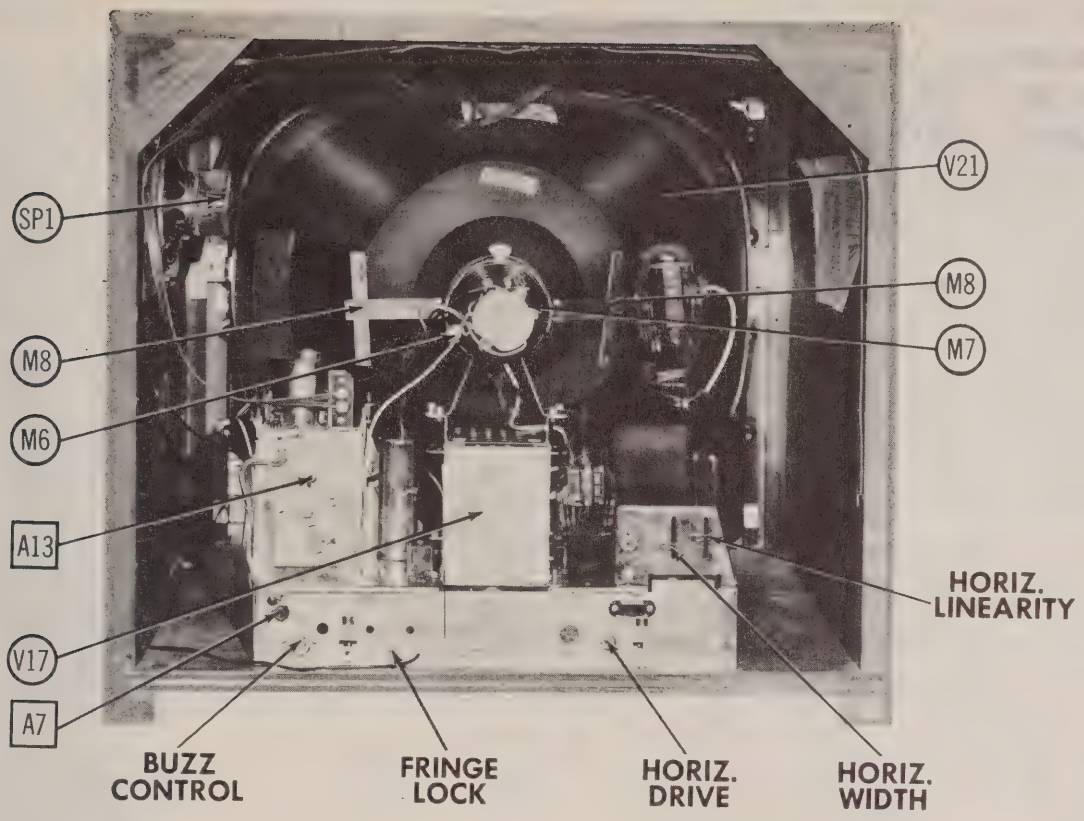
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal hold until the picture synchronizes horizontally.

Adjust the horizontal drive trimmer, (B1) for greatest picture width.

Adjust the width slug, B2, for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug, B3, for a picture that is symmetrical from left to right.

FRINGE LOCK ADJUSTMENT

Turn the fringe lock control to 1/4 turn from full clockwise position. Adjust the vertical and horizontal hold for picture synchronization and check stability by switching off channel and back again. Slightly retouch the fringe lock control adjustment, if necessary, for maximum stability while testing as above.

CORRECTOR MAGNET ADJUSTMENT

Adjust the vertical and horizontal size controls so that the corners and sides of the picture are visible.

Bend the corrector magnet arms for right angle corners and until opposite sides of the picture are parallel

Restore the picture to normal size.

AGC DELAY CONTROL ADJUSTMENT

Connect the vertical amplifier of an oscilloscope through 10KΩ to point ◇A◇ . Select the strongest TV signal available and adjust the delay control for 2 volts peak output.

DISASSEMBLY INSTRUCTIONS

1. Remove 9 push on type control knobs from front panel.
2. Remove 7 wood screws. Remove rear cover.
3. Disconnect speaker, ground lead and built-in antenna.
4. Remove 2 wood screws from CRT bracket.
5. Remove 4 chassis bolts. Remove chassis.
6. Remove 2 speaker nuts. Remove speaker.

NOTE: FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE CHASSIS AS OUTLINED ABOVE.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amplifier	6BK7	6BK7	9AJ	
V2	Converter	6U8	6U8	9-AE	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	1st. Video Amplifier Sound IF Amp.	6U8	6U8	9-AE	
V7	2nd. Video Amplifier Vert. Mult.	12AU7	12AU7	9A	
V8	AGC Keying- Vert. Mult.	12AX7	12AX7	9A	
V9	Audio Detector	6BN6	6BN6	7DF	
V10	Audio Output	6BK5	6BK5		
V11	Sync Separator	6BE6	6BE6		
V12	Vert. Mult. Vert. Output	6AH4GT	6AH4GT	8EL	
V13	Horiz. AFC	6AQ7GT	6AQ7GT	8CK	
V14	Horiz. Oscillator Horiz. Discharge	6SN7GT	6SN7GT	8BD	
V15	Horiz. Output	6CD6G	6CD6G	5BT	
V16	Damper	6V3	6V3	9BD	
V17	HV Rectifier	1B3GT	1B3GT	3C	
V18	HV Rectifier	1X2A	1X2A	9Y	
V19	LV Rectifier	5U4G	5U4G	5T	
V20	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: SYLVANIA PART No.	RMA BASE TYPE	NOTES
V21	21EP4A	21EP4A 21EP4 ①	I2C I2C	① Circuit changes necessary

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	400	22-2356	▲AFH3-46		UP784245	▲FP430.6	▲TVL-4739		
B	▲30	400		▲PRS25/50		BR505A	▲TC77	▲TVA-1711		
C	▲30	400								
D	40	25								
C2A	▲80	350	22-3418	E4D596				TVL-4607		
B	▲4	350								
C	▲100	25								
D	40	25								
C3A	▲40	400	22-2368	AFH4-123			FP396.2 TC3501	TVL-4804		
B	▲100	50								
C	▲10	475								
D	10	25								
C4	20	400	22-2389	PRS450/20		BR2045A	TC75	TVA-1709		
C5	100		22-2403							
C6	100		22-2403							
C7	2.5-6		22-2221							
C8	3		22-2434							
C9	100		22-2407							
C10	470		22-2404							
C11	470		22-2404							
C12	470		22-2404							
C13	470		22-2404							
C14	3.3-5.5		22-2405							
C15	470		22-2404							
C16	100		22-2407							
C17	19		22-2408							
C18	1.2-3.5		22-2405							
C19	470		22-2404							
C20	3		22-2412							
C21	5.5		22-2413							
C22	10		22-2411							
C23	4.7		22-2383							
C24	470		22-2404							
C25	470		22-6	SI470	D6-471	5R5T5	GP2K-471 NP0K-060	UC-5347	5GA-T47	
C26	8		22-2061				NP0K-050	ZT-555	5TCCB-V47	
C27	5		22-2050	SI5NP0	TCZ-4.7		NP0K-060			
C28	8		22-2051				NP0K-050			
C29	1000		22-7	BPD-001	DD-103	TM5D1	801-001	DC-521	5HK-D1	
C30	.47	200	22-2148							
C31	1		22-1762		TCZ-1		NP0K-010		5TCCB-V1	
C32	20		22-2450	SI20NP0	TCZ-20		NP0K-200	ZT-542	5TCCB-V2	
C33	1000		22-7	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C34	330		22-2309	SI330	D6-331		NP0K-331	UC-5333	5GA-T33	
C35	1000		22-7	BPD-001	DD-103	TM5D1	801-001	DC-521	5HK-D1	
C36	470		23-2302	SI470	D6-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C37	1000		22-7	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C38	470		22-6	SI470	D6-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C39	1000		22-7	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-S1	
C40	560		22-2310	SI560	D6-561		GP2K-561	UC-5356	5GA-T56	
C41	470		22-6	SI470	D6-471	TM5T5	GP2K-471 NP0K-070	UC-5347	5GA-T47	
C42	7		22-1874				NOBO-338-470			
C43	47		22-1876	SI47N0S0			NP0K-3R3	ZT-5533	5TCCB-V33	
C44	3.3		22-2343	SI3.3NP0	TCZ-3.3		GP2K-270	UC-5427		
C45	27		23-1608	SI27	D6-270		GP2K-471	UC-5347	5GA-T47	
C46	470		22-6	SI470	D6-471	TM5T5	821-01	DC-511	5HK-S1	
C47	1000		22-3	BPD-01	DD-103	TM581				
C48	.0082	600	22-2431				PTE6847	PT6147	6TM-D47	
C49	.047	600	22-1844	P688-047	DF-503		PTE4P22	PT4025	4TM-P22	
C50	.22	400	22-1825	P488-22						
C51	2000		22-8	BPD-002	DD-202	TM5D2	801-002	DC-522	5HK-D2	
C52	10000		22-3	BPD-01	DD-103	TM581	821-01	DC-511	5HK-S1	
C53	47	500	22-1876	1468-00005	D6-470	5W5Q5	GP1K-470	MC325	1FM-45	
C54	5		22-2050	SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	
C55	1		22-1762		TCZ-1		NP0K-010		5TCCB-V1	
C56	10000		22-3	BPD-01	DD-103	TM581	821-01	DC-511	5HK-S1	
C57	10		22-1895	SI10	D6-100	5W5Q1	GP1K-100	UC-541	5GA-Q1	

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C58	.047	200	22-1778	P284-047	DF-503	PTE4S47		PT4167	2TM-S47	
C59A	10000		22-2276	BPD-01	DD-3-103	TM5D81	821-01	DC-511	5HK-S81	
B	10000			BPD-01			821-01	DC-511		
C60	10000		22-3	BPD-01	DD-103	TM581	821-01	DC-511	5HK-S1	
C61	680		22-2367	SI680	D6-681	2R5T7	GP2K-681	UC-5368	5GA-T68	
C62	5000		22-4	BPD-004	D6-4-502	TM5D4	GP2-333-402	UC-534	5HK-D4	
C63	.0068	600	22-2268	P688-0068	D6-682	PTE5D68	GP2-333-682		6TM-D68	
C64	10000		22-3	BPD-01	DD-103	TM581	821-01	DC-511	5HK-S1	
C65	.01	600	22-1843	P688-01	D6-103	PTE5D1	GP2-333-103	PT61	6TM-S1	
C66	.0022	600	22-1845	P688-0022		PTE6D22		PT6222	6TM-D22	
C67	.1	600	22-1841	P688-1	DF-104	PTE4P1		PT401	4TM-P1	
C68	.01	600	22-2128	P688-001	D6-103	PTE5D1	GP2-333-103	PT61	6TM-D1	
C69	.001	600	22-2128	P688-001	D6-102	PTE6D1	GP2-333-103	PT621	6TM-D1	
C70	.0022	600	22-1814	P688-0022	D6-222	PTE6D22	GP2-333-222	PT6322	6TM-D22	
C71	.015	200	22-1850	P288-015		PTE6S15			6TM-S15	
C72	.1	200	22-1777	P288-1	DF-104	PTE2P1		PT401	2TM-P1	
C73	.022	600	22-2129	P688-022		PTE6S22		PT6123	6TM-S22	
C74	.022	200	22-2167	P488-22		PTE4P22		PT4022	2TM-P22	
C75	.0033	600	22-2248	P688-0033	D6-332	PTE5D33	GP2-333-332	PT6233	6TM-D3	
C76	56	500	22-1831					MCB230		
C77	75	500	22-1256	1469-000075						
C78	.15	200	22-2166	P288-15		PTE4P15			2TM-P15	
C79	.001	600	22-2127	P688-001	D6-102	PTE5D1	GP2L-102	PT621	6TM-D1	
C80	.1	200	22-1777	P288-1	DF-104	PTE2P1		PT401	2TM-P1	
C81	680		22-2367	SI680	D6-681	2R5T7	GP2K-681	UC-5368	5GA-T68	
C82	.0015	400	22-1785	P688-0015	D6-152					
C83	1000	500	22-2416							
C84	1000		22-7	BPD-001	DD-103	TM5D1	801-001	DC-521	5HK-D1	
C85	680		22-2367	SI680	D6-681	2R5T7	GP2K-681	UC-5368	5GA-T68	
C86	330		22-2309	SI330	D6-331		GP2K-331	UC-5333	5GA-T33	
C87	.047	400	22-1775	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C88	.001	600	22-2177	P688-001	D6-102	PTE5D1	GP2L-102	PT621	6TM-D1	
C89	.0047	600	22-1842	P688-0047	D6-472	PTE5D47	GP2-333-472	PT6247	6TM-D47	
C90	.15	400	22-2341	P488-15		PTE4P15			4TM-P15	
C91	.1	400	22-2340	P488-1		PTE4P1		PT401	4TM-P1	
C92	500	30000	22-1833	HV30C	TV3-502	MM-C30T5	413-501		30DK-T5	
C93	500	20000	22-1832	HV20C	TV3-502	MM-C20T5	413-501		20DK-T5	
C94	.0047	600	22-1849	P688-0047	D6-472	PTE5D47	GP2-333-472	PT6247	6TM-D47	
C95	10									Note 1

Note 1. Not used in all Models.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	63-2804	Q13-133	AG-50-Z	AB-50	U-48	Volume
B	Shaft		No t Req.	C-37	KSB-5	AK-4	DK-36	Attach to R1A
C	Switch		Not Req.	76-1	SWB	KB-1	UB-36	Attach to R1A
R2A	7.5Meg	½	63-2805			AB-39		Focus
B	Shaft		Not Req.			AK-1		Attach to R2A
R3A	7.5Meg	½	63-2394			AB-39		Height
B	Shaft		Not Req.			AK-1		Attach to R3A
R4A	10KΩ	½	63-2825	QJ-359 *			UF14L	Contrast-Panel
B	200KΩ	½					UR254L	Brightness- Rear
C	Shaft						D6-35	Attach to R4B Shaft
R5	4000Ω	1	63-2159					Vert. Range-Wire Wound
R6A	2500Ω	½	63-2795	Q11-112	AG-15-B	AB-7	U-8	Vert. Hold
B	Shaft		Not Req.	Not Req.	KSB-3	AK-4	Not Req.	Attach to R6A
R7A	1500Ω	2	63-2812	WK-1500	A43-1500	VK-120	R1500L	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R7A
R8A	5000Ω	½	63-2824	Q13-114	AG-19-B	AB-11	U-12	Picture
B	Shaft		Not Req.		KSB-3	AK-4	Not Req.	Attach to R8A
R9	4000Ω	1	63-2159					AGC Delay-Wire Wound
R10A	1 Meg	½	63-2810	Q11-137	AG-8-B	AB-39	U-54	Tone
B	Shaft		Not Req.	Not Req.	KSB-3	AK-4	Not Req.	Attach to R10A
R11A	7.5 Meg	½	63-2805			AB-39		Fringe Lock
B	Shaft		Not Req.			AK-1		Attach to R11A
R12	500Ω	1	63-2050					Buzz-Wire Wound

* CONCENTRKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS B17-116 & P1-128 (Panel) B11-129 & R7-212 (Rear).

† Use C-3 Coupler and part of original shaft to obtain required length

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	ZENITH PART No.	IRC PART No.	NOTES
R13	47KΩ	½	63-1856		
R14	470KΩ	½	63-1897		
R15	22KΩ	½	63-1942		
R16	220KΩ	½	63-1894		
R17	4700Ω	½	63-1813		
R18	100KΩ	½	63-1869	BTS-100K	
R19	120KΩ	½	63-1873	BTS-120K	
R20	3700Ω	½			
R21	4700Ω	½	63-1814		
R22	100KΩ	½	63-1869		
R23	100KΩ	½	63-1869		
R24	18KΩ	1	63-2807		
R25	22KΩ	1	63-958		
R26	2200Ω	½	63-1799		
R27	2200Ω	½	63-1799		
R28	330Ω	1	63-2396	BTA-330	
R29	56Ω	½	63-1733		
R30	68Ω	½	63-1737	BTS-3900	
R31	3900Ω	½	63-1810	BTS-3900	
R32	4700Ω	½	63-1772	BTS-470	
R33	6800Ω	½	63-1823		
R34	27KΩ	½	63-1845		
R35	15Ω	½	63-1708		
R36	56Ω	½	63-1775	BTS-560	
R37	120KΩ	½	63-1873	BTS-120K	
R38	120KΩ	½	63-1873	BTS-120K	
R39	470Ω	½	63-1771	BTS-470	
R40	47KΩ	½	63-1855		
R41	100Ω	½	63-1743	BTS-100	
R42	180Ω	1		BTS-180	
R43	2700Ω	1	63-1573	BTA-2700	
R44	22KΩ	½	63-1841	BTS-22K	
R45	470KΩ	½	63-1898	BTS-470K	
R46	22KΩ	½	63-1841	BTS-22K	
R47	4.3Meg-5%	½	63-1837	BTS-4.3Meg-5%	
R48	8200Ω-5%	2	63-1579	BTB-8200-5%	
R49	680Ω	½	63-1778	BTS-680	
R50	10KΩ	½	63-1828	BTS-10K	
R51	82Ω	½	63-1740	BTS-82	
R52	470KΩ-5%	½	63-1896	BTS-470K-5%	
R53	1 Meg	½	63-1911	BTS-1 Meg	
R54	220Ω	½	63-1757	BTS-220	
R55	2200Ω	½	63-1799	BTS-2200	
R56	3900Ω	½	63-1810	BTS-3900	
R57	1000Ω	½	63-1786	BTS-1000	
R58	1 Meg	½	63-1911	BTS-1 Meg	
R59	470Ω	½	63-1771	BTS-470	
R60	8200Ω	2	63-1101	BTB-8200	
R61	220KΩ	½	63-1894	BTS-220K	
R62	220KΩ	½	63-1883	BTS-220K	
R63	470KΩ	½	63-1898	BTS-470K	
R64	2.2Meg	½	63-1926	BTS-2.2Meg	
R65	100KΩ	½	63-1869	BTS-100K	
R66	680KΩ	½	63-1904	BTS-680K	
R67	100KΩ	2	63-1902	BTB-100K	
R68	3900Ω	½	63-1810	BTS-3900	
R69	8200Ω	½	63-1824	BTS-8200	
R70	220KΩ	½	63-1883	BTS-220K	
R71	27KΩ	½	63-1845	BTS-27K	
R72	56KΩ	½	63-1859	BTS-56K	
R73	22KΩ	1	63-1055	BTA-22K	

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	ZENITH PART No.	IRC PART No.	NOTES
R74	680Ω	½	63-1778	BTS-680	
R75	220KΩ	½	63-1883	BTS-220K	
R76	330KΩ	½	63-1890	BTS-330K	
R77	100Ω	½	63-1743	BTS-100	
R78	1000Ω	½	63-1786		Note 1
R79	10KΩ	½	63-1828	BTS-10K	Note 2
R80	470Ω	½	63-2398	BTA-470	
R81	1.5Meg	½	63-1918	BTS-1.5Meg	
R82	27KΩ	½		BTA-27K	Note 3
R83	330KΩ	½	63-1890	BTS-330K	
R84	100KΩ	½	63-1869	BTS-100K	
R85	33KΩ	1	63-1948	BTA-33K	
R86	470KΩ	½	63-1897	BTS-470K	
R87	47KΩ	½	63-1855	BTS-47K	
R88	100KΩ	½	63-1869	BTS-100K	
R89	180KΩ	½	63-1880	BTS-180K	
R90	3.3Meg	½	63-1932	BTS-3.3Meg	
R91	15KΩ	½	63-1834	BTS-15K	
R92	100Ω	½	63-1744		
R93	1.8Meg	½	63-1922	BTS-1.8Meg	
R94	330Ω	½	63-2286	BTA-330	
R95	47KΩ	½	63-1855	BTS-47K	
R96	330Ω	½	63-2286	BTA-330	
R97	1 Meg	½	63-1911	BTS-1 Meg	
R98	1 Meg	½	63-1911	BTS-1 Meg	
R99	1 Meg	½	63-1911	BTS-1 Meg	
R100	100Ω	½	63-1744		
R101	47KΩ	½	63-1855	BTS-47K	Note 4
R102	470Ω	½	63-1771	BTS 470	
R103	10KΩ	2	63-1190	BTS-10K	
R104	47KΩ	1	63-1194	BTA-47K	
R105	22KΩ	½	63-1843	BTS-22K	
R106	47KΩ	½	63-1856	BTS-47K	
R107	150KΩ	½	63-1876	BTS-150K	
R108	22KΩ	½	63-958	BTA-22K	
R109	15KΩ	½	63-1834	BTS-15K	
R110	100Ω	½	63-1744		
R111	470KΩ	½	63-1898	BTS-470K	
R112	150Ω	1	63-2284	BTA-150	
R113	68Ω	2	63-2309	BW-2-68	
R114	12KΩ	2	63-1023	BTB-12K	
R115	15KΩ	2	63-942	BTB-15K	
R116	4700Ω	2	63-966	BTB-4700	
R117	4700Ω	2	63-966	BTB-4700	
R118	2.2Ω	½	63-2314		
R119	2.2Ω	½	63-2314		
R120	2.5Meg	2	63-2816		
R121	4000Ω	10	63-2794	1 3/4A-4000	
R122	1 Meg	½		BTS-1 Meg	Note 5
R123	150KΩ	½	63-1876	1 5TS-150K	

Note 1 Not used in all models.
Note 2 Used only in radio & TV combination.
Note 3 Some models use a 39KΩ resistor in this application.
Note 4 Some models use a 27KΩ resistor in this application.
Note 5 Some models connect a 1 Meg resistor in series with height control & plate of vert. MV.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	ZENITH PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC ② 2A	516VCT .300ADC	5VAC ② 6A	6.3VAC ② 5.5A SEC. 4 6.3VAC ③ 5 4A	95-1311				

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	ZENITH PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	347Ω tap ③ 80, 100, 170	1 4Ω SEC. 2 0Ω SEC. 3 0Ω	S19032					Horiz. Output Trans.
T3	3990 tap ② 290, 39Ω		95-1309					Vert. Output Trans.
T4A B	181Ω 48Ω		95-1306	DY-9A	MDF-70	TY-3	Y-17	Horiz. Deflection Coils Vert. Deflection Coils

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	ZENITH PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T5	6.6KΩ	3 Ω	550Ω	.66Ω	95-1294	A-3878 ①	A-2931 ↓	RO-13 ↓	S-7X ↓	↓ Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	ZENITH PART No.	JENSEN PART No	QUAM PART No	NOTES
SP1	5-1/4	PM	3.2Ω	46-496 49-649 ① 49-704 ② 49-694 ③	ST-803 Mod. P525-V	52A1	① 10" PM speaker used in Models K2260R and K2262R ② 12" PM speaker used in Models K2291E and K2287R ③ Alternate 12" speaker

FILTER CHOKE

ITEM No	RATINGS: TOTAL CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE @ CURRENT	ZENITH PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.225ADC	71Ω	3 Hy.	95-1280		C-3994 ①	TR-3500 ①	C-21X ①

↓ Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES PRI.	DC RES SEC.	ZENITH PART No.	MERIT PART No	NOTES
L2	FM Trap	0Ω		S-18858		
L3	FM Trap	0Ω		S-18858		
L4	Ant. Coil	0Ω		S-18860		Channel 2
L5	Fil. Choke	0Ω				
L6	Neutralizing Coil	0Ω				
L7	RF Plate Coil	0Ω				
L8	RF, Mixer Grid & Osc. Coils	0Ω		S-18872		Channel 2
L9	Mixer Grid Coil	0Ω				
L10	Osc. Grid Coil	0Ω				

ZENITH MODELS K2230E, R, K2240E, R, K2260R, K2263E, K2266, R, K2267E, K2268R, K2270H, R, K2287R, K2290R, K2291E, (Ch. 21K20)

PARTS LIST AND DESCRIPTIONS (Continued)

RF-IF COILS (CONT.)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA MERIT PART No.	NOTES
L11	Osc. Plate Coil	.7Ω				
L12	Conv. Plate	.3Ω		S-18857		
L13	Sound Carrier Trap	0Ω		S-18209		
L14	Adj. Channel Picture Trap	0Ω		S-16744		
L15	Adj. Channel Sound Trap	0Ω		S-18210		
L16	1st. Video IF	.1Ω		S-18589		
L17	Cathode Trap	.1Ω		S-19002		Less Coil Shield & Lug Assembly Part #S-19003
L18	2nd. Video IF	.1Ω	.1Ω	S-17907		
L19	Fil. Choke	.1Ω		S-16984		
L20	3rd. Video IF	.2Ω	.1Ω	S-18730		Less Coil Shield & Lug Assembly Part #S-18741
L21	Shunt Peaking Coil	4.4Ω		S-17343	TV-181	97 Microhenries
L22	Shunt Peaking Coil	13Ω		S-17958	TV-188	481 Microhenries
L23	Shunt Peaking Coil	22Ω		S-18749		15.6 Microhenries
L24	Series Peaking Coil	6.2Ω		S-18750	TV-184	Wound on resistor - 180 Microhenries
L25	1st. Sound IF	2Ω	3.7Ω	S-18568		
L26	2nd. Sound IF	5.5Ω		S-19006		Tapped @ 2.7Ω & 4.6Ω
L27	Quadrature Coil	5Ω		S-19001		
L28	Horiz. Osc.	150Ω		S-17114		Tapped @ 95Ω
L29	Width Coil	17Ω	2Ω	S-18748		
L30	Horiz. Lin.	6.5Ω		S-19342	MWC-2	

FUSES

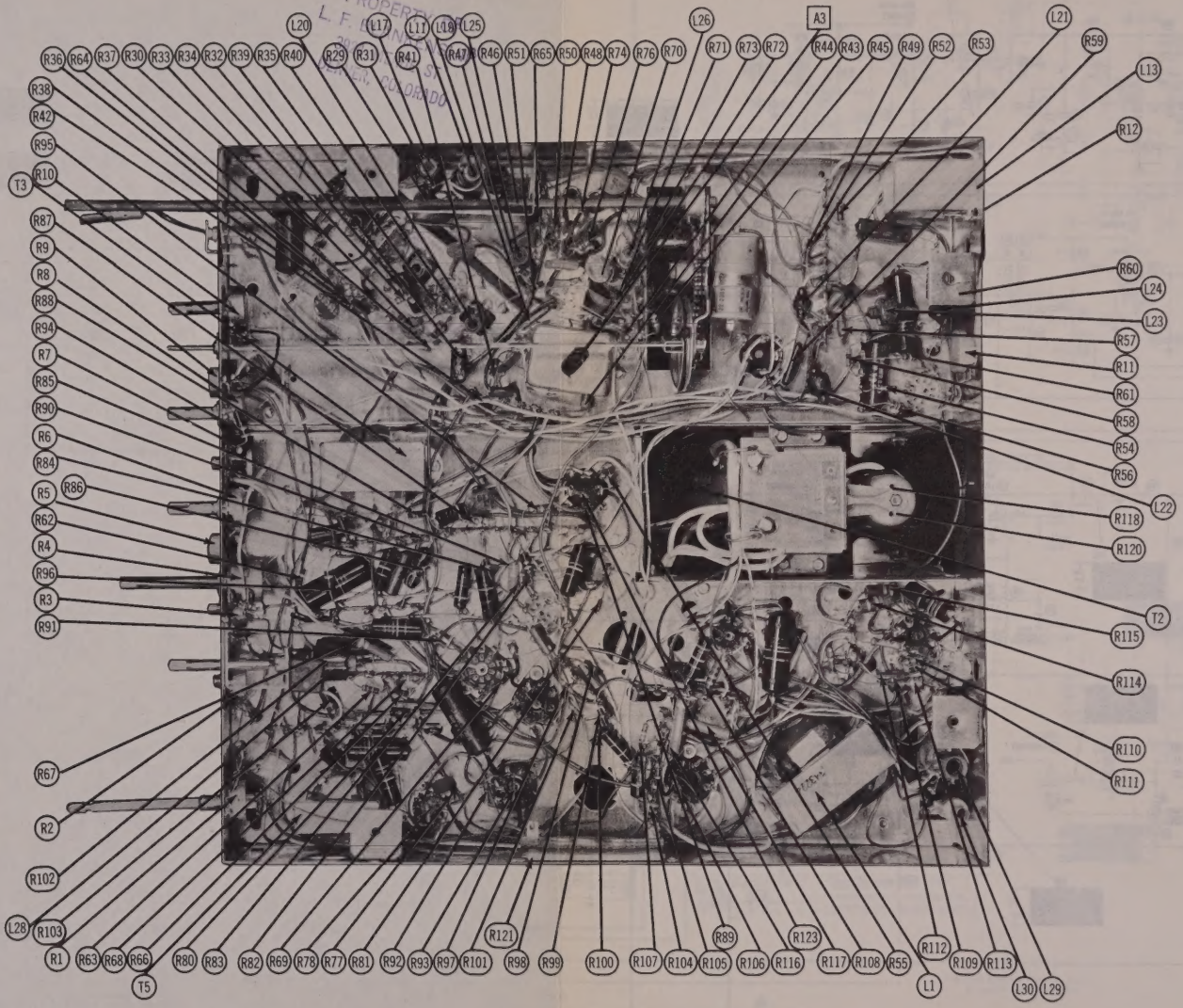
ITEM No.	TYPE	RATING	REPLACEMENT DATA ZENITH PART No. FUSE	ZENITH PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG Slo-Blo	2/10 A 125V	136-23	83-1883	313.200	357001	MDL 2/10	4405

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA	NOTES
M2	Bayonet	6-8	.15	Brown	100-67		Type No. 47.

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	RF Tuner	S-18770	Complete
M4	4th Video IF Coil	S-18740	Video Detector Assembly Part No. S-18590
	Capacitor	22-1874	7MMF
	Crystal	103-1	1N64
	Peaking Coil	S-17911	
	Peaking Coil	S-18751	Wound on resistor.
	Peaking Coil	S-15128	
M5	Integrator Unit	87-1	
M6A	Centering Magnet	S-18439	
B	Centering Magnet	S-18118	Alternate
M7	Ion Trap	S-17164	
M8	Magnet	S-18763	Anti-Pin Cushion Correction (2 Used)
B1	Trimmer	22-2398	Horizontal Drive
	Antenna Coil	S-18861	Channel 3
	Antenna Coil	S-18862	Channel 4
	Antenna Coil	S-18863	Channel 5
	Antenna Coil	S-18864	Channel 6
	Antenna Coil	S-18865	Channel 7
	Antenna Coil	S-18866	Channel 8
	Antenna Coil	S-18867	Channel 9
	Antenna Coil	S-18868	Channel 10
	Antenna Coil	S-18869	Channel 11
	Antenna Coil	S-18870	Channel 12
	Antenna Coil	S-18871	Channel 13
	RF, Mixer Grid and Osc. Coil	S-18873	Channel 3
	RF, Mixer Grid and Osc. Coil	S-18874	Channel 4
	RF, Mixer Grid and Osc. Coil	S-18875	Channel 5
	RF, Mixer Grid and Osc. Coil	S-18876	Channel 6
	RF, Mixer Grid and Osc. Coil	S-18877	Channel 7
	RF, Mixer Grid and Osc. Coil	S-18878	Channel 8
	RF, Mixer Grid and Osc. Coil	S-18879	Channel 9
	RF, Mixer Grid and Osc. Coil	S-18880	Channel 10
	RF, Mixer Grid and Osc. Coil	S-18881	Channel 11
	RF, Mixer Grid and Osc. Coil	S-18882	Channel 12
	RF, Mixer Grid and Osc. Coil	S-18883	Channel 13
	Knob	46-1003	Horizontal Hold
	Knob	46-1005	Vertical Hold and Tone
	Knob	46-1016	Picture
	Knob	46-1017	Brightness
	Knob	46-1018	Contrast
	Knob	46-1052	Fine Tuning
	Knob	S-19283	Channel Selector & Disc. Assy. — Models K2230E, K2240E, K2263E, K2267E, K2291E
	Knob	S-19285	Off/On Volume & Disc. Assy. — Models K2230E, K2240E, K2263E, K2267E, K2291E
	Knob	S-19282	Channel Selector & Disc. Assy. — Models K2230R, K2240R, K2260R, K2266, K2266R, K2268R, K2287R, K2290R
	Knob	S-19284	Off/On Volume & Disc. Assy. — Models K2230R, K2240R, K2260R, K2266, K2266R, K2268R, K2287R, K2290R
	Control Cover Assy.	S-19289	Models K2230E, K2240E, K2263E, K2267E, K2291E
	Control Cover Assy.	S-18950	Models K2230R, K2240R, K2260R, K2266, K2266R, K2268R, K2287R, K2290R.
	Back Cover Assy.	S-19089	



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